

The **MINING** **CONGRESS** **JOURNAL**



OCTOBER

1936

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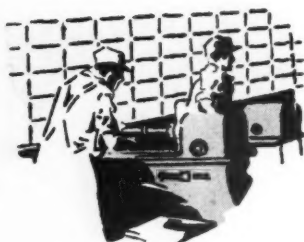


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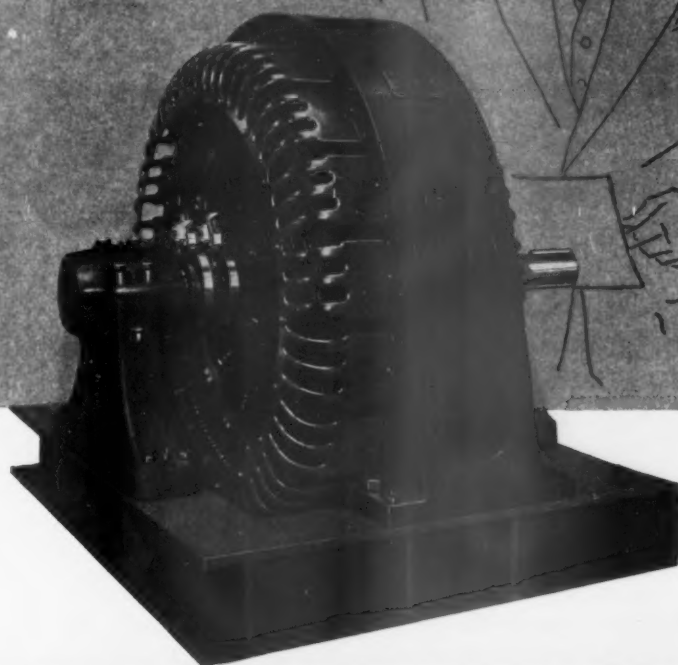
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The Mining Congress Journal

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THE AMERICAN MINING CONGRESS

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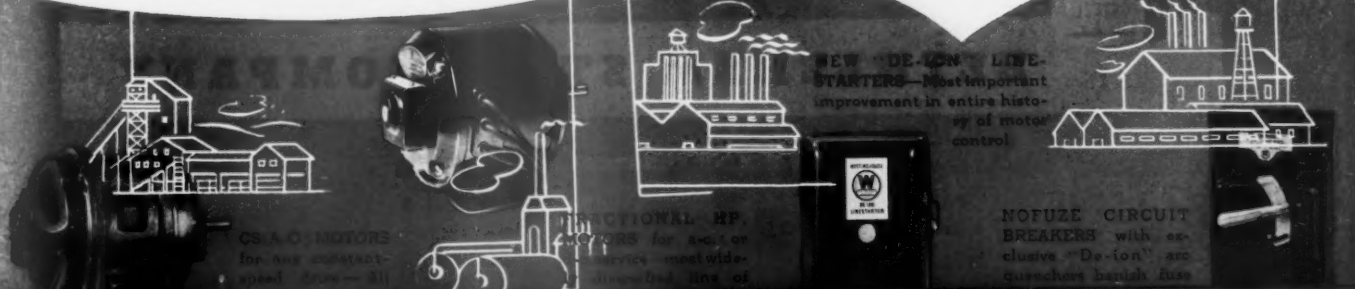
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A Government Responsibility

THE home is the fundamental basis of every democratic nation.

I To it must the nation look for that man power necessary for public defense and to its earning power to be taxed for the support of the Government.

Every such home owner must be able to earn enough to support that home and at the same time produce a surplus for Government support.

To accomplish this there must be a market for the surplus material which that home owner can produce.

If the home is a farm, the greater part of its necessities should be produced by the farm, but it must at the same time have a market in which its surplus may be sold both to buy those things which it cannot produce and to provide for its share of Government support.

This implies a market in which its surplus can be sold at a price in excess of the cost of production.

The relation of that home to the Government must be one of mutual obligation. The duty of the Government to protect the market into which the home surplus goes upon the one hand is reciprocal to the obligation of that home owner to pay taxes for the support of Government.

The farm home must find in the city dweller a market for his surplus food products, as the city dweller must find upon the farm, either directly or indirectly, a market for the surplus materials of the industry of which he is a part. Each will buy his necessities in the best market available.

If the underpaid workers of Central Europe are able to sell to the farmer his necessities at a lower price than the city dweller can provide them, the farmer will buy from the foreign producer and the city manufacturing plant will be obliged either to close its doors or reduce the wages of its employees.

On the other hand, if the city dweller can find cheaper markets for his food necessities than can be supplied by the farmer, then the city dweller will buy his supplies from that foreign market which is able to underbid the farmer in this competitive race.

Unless the Government provides conditions under which both the city and the farm producers may find a profitable market, neither of them will be able to pay the taxes which are necessary for Government support.

Domestic producers may compete with each other in the domestic markets, and such competition is essential to the proper protection of the consumer. But if these domestic producers are required to compete with nations with a much lower standard of living, and therefore working for greatly reduced wages, and therefore able to sell at less than the domestic cost, the local producers will find themselves without a market and unable to pay their proper share for the support of Government.

It would seem, therefore, to be the first duty of Government to maintain conditions which provide each domestic producer an opportunity in those markets which are available to him.

Without this aid, the home owner must fail as a home owner and as a taxpayer. It is therefore the duty of Government to so protect the domestic producer as to give him an opportunity to maintain his home, and indirectly to maintain the Government.

J. Calbraath

The Mining Congress Journal



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E. R. COOMBES, Editor

A Journal for the entire mining industry published by The American Mining Congress

The Next Congress

WHILE this is but October, and the question of who will occupy the White House is still undecided by the voters, there is no uncertainty that the next session of Congress will be a lively one.

Both Democratic and Republican candidates have made commitments which will call for legislation, and many of the New Deal agencies now upon the books will expire within a few months. Monetary questions may be to the fore, since the authority given the President to vary the gold content of the dollar expires in January. Farm legislation, strengthening of anti-monopoly laws, reciprocal trade agreements, and taxation, all appear to be headed for congressional discussion and possible legislation. And regardless of election results, relief will be a paramount issue, and the Supreme Court decisions upon the legality of certain laws now before it may again bring into the legislative hopper issues now upon the statute books. There is considerable talk of new legislation along the lines of the late unlamented National Industrial Recovery Act and of still another Guffey Coal Bill.

All in all it looks like a busy winter on the Potomac.

A Declaration of Policy

IT IS a real achievement when an industry so comprehensive as metal mining unanimously adopts a platform of performance and agrees upon united action upon problems of grave import. Thus the Western Division of the American Mining Congress deserves the applause of industry because of its achievement in this regard. There are no honorary medals available for such performance, so we create and bestow one ourselves, and give to that group the "Award of Merit" to which it is entitled. The Western Division represents the producers of copper, iron, lead, zinc, silver, gold, and miscellaneous minerals. In convention assembled, through representatives of their own choosing, fully authorized to speak for their industries and districts, they presented a united front upon such important subjects as "Taxation and Finance," "Extension of Federal Government," "Government in Business," "Reciprocal Trade Agreements," "Currency," "Labor," "Relief," and "Economic Stability." They further urged their fellow operators not now affiliated with the Division to join with them in protecting the industry.

Briefly they ask for a fair deal in taxation and condemn the principle of a penalty on undistributed earnings; urge the prompt reduction of Government expenditures, and the use of the tax solely to raise necessary revenue. They deplore the tendency to center supervision of business in the Federal Government, and urge that Government retire from business competition. They declare that tariff rates should not be made through trade agreements without specific approval of such changes by Congress after public hearing. They favor return of monetary control to Congress, favoring a currency system with a metallic base. They advocate cooperative efforts of labor, management and capital, without governmental interference with such cooperation. They urge direct relief be substituted for work relief, and voiced their confidence in the country.

Any mining man should be able to subscribe to the principles thus briefly presented. And the fact that approximately 85 percent of the industry does so subscribe is complete evidence that western mining is farsighted, and that the men who are guiding its destiny have wisdom and the courage of their convictions.

Clarifying the Issue

POSSIBLY no single piece of legislation has caused such consternation and bewilderment as has the Robinson-Patman Price Discrimination Act, which is now on its way through the tortuous road to a decision as to its constitutionality. The caravan has begun with two cheese companies, a floor covering manufacturer, and a mail-order house, each charged by the Federal Trade Commission with violations of the act.

In spite of the fact that this legislation intimately affects all business, and prescribes severe penalties for departures from many long established business practices, it was concocted and hurried through Congress under pressure and without any general understanding of what it involved.

The cases in point bring up the question as to just what the meaning of Section 2 (a) of the act may be. This section states that all price discriminations between different purchasers of commodities of like grade and quality are prohibited, if such discrimination "may tend to lessen competition or to create a monopoly." The proviso relating to quantity differentials has been circumscribed in such beclouded language that industry can only hesitate and beware.

Federal Power and Mineral Industries of the Western States*



Boulder Dam

IN THE PAST two centuries there have been two basic events upon which rests our present industrial civilization, the invention of the steam engine by James Watt and the discovery of the principle of the electric dynamo by Faraday. Following the dynamo, development of long-distance transmission by Edison and others, and the evolution of efficient motors, were primary factors in the great growth in the past half century of the copper industry and created large demand for steel and the common nonferrous metals.

Now we have in the West great dams constructed by the Government with Public Works Administration funds, under the direction of the Bureau of Reclamation, for flood control, navigation and irrigation, as relief and recovery measures, but incidentally designed to produce huge quantities of electric power. How is this going to be useful to our western mineral industries, and conversely, how far can our industries contribute to its economic use? They should if they can, in order that the great Federal investments may be utilized.

We know that Boulder Dam was con-

* Presented to the Annual Metal Mining Convention, Western Division, American Mining Congress, Denver, Colo., Sept. 23, 1936.

† Director, U. S. Bureau of Mines.

By JOHN WELLINGTON FINCH†

ceived and executed after sound engineering investigation. Besides water supply and flood control, it will furnish power to an area of congested population and rapidly growing industry. Also the great projects of the Northwest are in or near a territory of dense population and of rapidly growing industrial expansion. Inland navigation is desirable for proper growth of trade.

It is claimed by some that irrigation of more land is not now needed. Nevertheless, it is inevitable that with industrial growth the nearby production of food stuffs will be required to maintain a low cost of living around the centers of power distribution.

Power at reasonable cost for general use will, I believe, be needed in some amount as soon as available, and the demand will grow. No doubt you have noted the disposition of the Government, as represented by the Reclamation Service in the West, to cooperate with existing power companies in the distribution

of Federal power. This paper does not advocate destructive competition by Government with existing utilities. It does suggest the use of power by the Government itself to carry out certain experiments for the public benefit, as will be explained. This may result, it is hoped, in important new industries that might consume great quantities of power at reasonable prices.

The enormous dams, transmission lines, construction equipment, and housing have already supplied a market for important amounts of the metals, cement, and other building materials. But such use of mineral products for construction and installation may be negligible as compared with the possibilities of stimulating entirely new mineral production, as I shall attempt to show.

COSTS OF GOVERNMENT WATER POWER

Assuming that these power projects will be amortized from earnings, what are the unit costs of power likely to be?

One thing to remember is that 75 to 80 percent of the total cost of power generated from water is made up of overhead. Most of the overhead is interest on the money invested, plus sinking fund. Taxes and insurance are of considerable importance in privately operated power developments, but not in a Federal project. But in either case, power costs mount if any part of an hydroelectric plant stands idle for any important fraction of the time. The load factor is of first importance. Therefore, power-consuming industries will have to be created for the Government plants if the full advantage of low-cost power is to be achieved. It seems probable that the mineral industries will offer some developments for this purpose.

The two big factors affecting cost of power at great western dams are the low interest rate that the Government has to pay for money in comparison with the rates that industry would have to pay, and exemption from taxation. Amortization of a Government plant is also spread over a longer period. This practically means that, if managed with the same efficiency, it is probable that Government-financed plants will generate power for about half the cost possible at industrially financed plants. For these reasons power at Boulder Dam with a 100 percent load factor can be produced at less than 2 mills per kilowatt-hour, and with a 50 percent load factor for about 2½ mills.

IMPORTANCE OF WESTERN HYDRO-ELECTRIC POWER SOURCES

One most impressive fact is that the total potential hydroelectric power of the nation is so distributed that slightly under 80 percent is in the West. Potential power does not, of course, mean economic power until it is needed. We have known for a long time that this potential power exists, but it was not clear what we could do with it if it were developed, or how the money could be found for construction, what financial agencies could live through a long series of lean years before a substantial backlog of demand was in sight and while the load factor was being built up. Now all questions but what to do with the power are being solved for us by the Government.

The amount of power available is so huge that not only the mineral industry

should study its uses, but possibly the load factor may become favorable only through galvanizing the whole social organization into consideration of power utilization. Agriculture has hardly begun to learn how to use electric power. Railroads know how to electrify but are faced with large expenditures in order to convert their lines. The power must be offered to them at a real bargain in order to influence the change. The same applies to other industries that switch from nonelectric to electric methods of doing things.

A voluminous literature has already appeared discussing the possible effect upon the mineral industry of cheap power production at Federal projects. It has been recognized that present requirements of other industries are reasonably well served by existing power developments. Most of such discussions have been devoted to showing enormous mineral reserves, loosely estimated, principally of minerals now supplied from abroad, within comparatively short distances from the power projects and to

cheap production of electric power from solid fuel, and it is entirely possible that centers of cheap power production may develop in the large coal-mining districts which could compete in cost with Federal water-power projects.

In order not to do grave injury to stockholders in existing power companies, such industries must be entirely new. New processes are necessary, capable of producing new products which take advantage of a favorable juxtaposition of mineral resources and power. This calls for electrometallurgical industries. The Bureau of Mines has been privileged in a modest way to attempt the development of such processes.

The three larger dams, Boulder, Bonneville, and Grand Coulee, are capable of developing, when completed and in full operation, a possible total of over 5,000,000 hp. In other words, these three power projects alone will be capable of producing nearly 8 per cent of the total power generated in the United States. It is evident that new industries must be of major proportions to use an important percentage of this power.

It is improbable that aluminum production is likely to shift to the West unless specially favorable ores are found near the power sites or that the ferro-alloy business, so long as it operates from present sources of supply, can be enticed from the East. The same may be said of other alloy industries, such as steel and brass. They will continue to prefer locations near their large markets. The magnesium industry, as it is now constituted, depends upon a kind of source material not available in the West. Whether this industry can be reconstituted by

use of western deposits remains to be determined. Any hope then of building up an electrometallurgical industry at Boulder, Bonneville, or Grand Coulee will depend upon our ability to develop a new product or to manufacture a standard product from raw material not now usable which exists within a favorable shipping radius from the power site.

We have studied carefully the possibilities in this respect and are inclined to list them in the following order, according to their promise:

1. Electrolytic manganese metal.
2. Pure chromium or ferro-chromium.
3. Metallic magnesium.



Bonneville Project

the calculation of the power which would be consumed if new mining industries were developed to supply domestic deficiencies and if existing electrometallurgical operations could be transferred from their present locations to new ones near power sites. Generally they predicate that the existence of available power at less cost will not only start new industries but develop new markets for products.

A cheap power, even at 2 mills per kilowatt-hour, is of itself by no means sufficient to bring about any major expansion or shift in existing industry. It should be remembered that progress is continually being made in the field of

4. Electric smelting of nonferrous metals.

5. Electrolytic antimony.

Experimental investigations toward the development of these possibilities are now under way. So far as we know, only two agencies have been doing actual experimental work. Washington State College, at Pullman, Wash., under grants obtained from the State Planning Council, has investigated the production of aluminum from clays, the preparation of magnesium salts from magnesite deposits, and the leaching of manganese ores from the Olympic Peninsula. Progress results have been published in a series of bulletins issued by the college.

The work of the Bureau of Mines has been made possible through the efforts of Representative James G. Scrugham, of Nevada, who obtained last year an appropriation of \$20,000 for the establishment of an electrometallurgical laboratory at Reno, Nev. Three problems were selected as most promising for the initial work of this laboratory. They were the electrolytic production of manganese, the production of a satisfactory grade of ferro-chrome from the iron ores of southern Montana and northern Wyoming, and the treatment of Utah aluminates, to produce marketable products. The results of the first year's investigations are recorded in a report just issued.

1. MANGANESE. Pure manganese metal at a proper price will bring to the metallurgist a new raw material. If the metal can be produced electrolytically from suitable ores known to exist near any of the three larger power projects, at a power consumption comparable to that of electrolytic zinc, successful competition with foreign ores used in

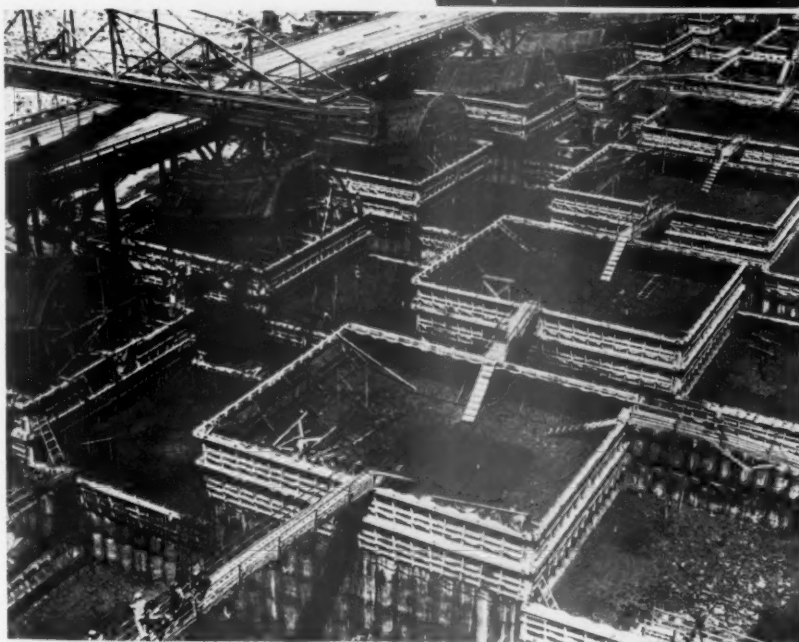
the production of ferro-manganese in the East is definitely possible. Recent experimentation by the Electrometallurgical Section of the Bureau has shown this possibility to be most promising. While competition will provide an urge to produce at lower costs in the East, it is our opinion that a substantial manganese industry can be built up without serious competition with the ferro-manganese industry as now established. This can be done by the substitution of electrolytic manganese in many alloys, ferrous and nonferrous, for more expensive materials, such as nickel, chromium, and tungsten. The extent to which such substitution in alloys can be made, given a high purity manganese in a price range of 10 to 15 cents a pound, remains to be determined. The cost of commercial manganese for ordinary purposes will be much less. Power cost is about one-half cent a pound. If successful

production of western manganese metal should be established, it is to be assumed that ultimately it would displace the imports of manganese ores. At least in time of war the country should be made independent of foreign supplies.

The problem of producing pure electrolytic manganese has yielded most readily to experimental investigation, and a process has been developed for the continuous deposition of electrolytic manganese from ores that occur in large bodies in the vicinity of Boulder Dam. No attempt will be made here to give the details of the process, except to say that it depends upon the leaching of the ore to form manganese sulphate which may usually be accomplished by treating with a solution of sulphur dioxide. Manganese carbonate is precipitated from the sulphate solution by the addition of ammonium carbonate. This is a convenient method for the purification of the man-



Two Views of Grand Coulee Damsite



ganese. The manganese carbonate is added directly to the electrolytic cell which uses an electrolyte of manganese and ammonium sulphates and sulphites. The ammonium carbonate used for precipitation is recovered by treatment of the solution with limestone. Consequently the only raw materials required for the process other than manganese ore are sulphur dioxide and limestone, both of which are relatively cheap materials. The manganese produced is of very high purity and is precipitated in the form of bright, coherent sheets. Many details essential to commercial operation remain to be worked out, but we feel that the fundamental problem of continuously depositing manganese from a renewable

electrolyte has been solved, and it is applicable to low-grade ores.

Patent applications covering this basic discovery have been filed in the name of the inventor, and will be assigned to the Government for administration by the Secretary of the Interior.

2. CHROMIUM. The Bureau recognizes a conservation aspect in chromium utilization in addition to its importance as a strategic metal now imported. I am told that present practice in making chrome steel wastes chrome metal. There is no way now known to introduce the metal into the steel except as ferro-chrome. The loss of chromium is in the preparation of ferro-chrome. Most of the future increase in demand for chromium is certain to be for carbon-free ferro-chrome or chromium metal. The possibility of building up a standard present-day ferro-chrome industry at any of the western power projects seems remote.

Aside from comparatively small reserves in California, the raw materials to which we must look for our supply of chromium for an electrometallurgical industry in the West are those of western Montana and northern Wyoming. These ores cannot be concentrated to more than 44 per cent Cr_2O_3 and the chromium-iron ratio is such that direct smelting yields ferro-chrome containing approximately 50 percent iron. The ore that can be imported from the Philippines is of similar character. Before a chromium industry can be established, methods must be found which will convert these ores into carbon-free ferro-chrome ore and greatly improve the chromium-iron ratio. Possibly the Bureau's Boulder City plant will accomplish this. Power from the Casper-Alcova Dam could then be used by the Government to produce strategic requirements.

It should be stated that interesting possibilities have been developed by the Bureau in the treatment of low-grade chromium ores. Though the outlook is hopeful, no satisfactory solution has as yet been found.

3. MAGNESIUM. It is difficult to predict whether a magnesium industry is a reasonable possibility. An adequate supply of raw material in the form of magnesites is available at a number of points. Also, the waters of Great Salt Lake and the ocean are sources of magnesium, as are the polyhalite potash deposits of Texas and New Mexico. The magnesite deposits at Chewelah, Wash., are well situated with regard to the Grand Coulee development. Working out a satisfactory method for magnesium production from magnesite does not present insurmountable difficulties. However, the present demand for magnesium is small on account of the poor impact strength of the purer metal. Its present production from brines appears to be on an economical basis. Development of a magnesium industry, therefore, requires not only a method for production from the raw material at hand but the development of a market. The latter problem is not, we believe, one primarily of sales

promotion but calls for the manufacture of magnesium alloys with properties which make them suitable for a wider variety of uses than the metal has at present.

4. NONFERROUS SMELTING. More and more attention is being given by the smelter operator to his by-products, particularly to smelter effluents. In handling these materials, such as sulphur, arsenic, antimony, and selenium, the electric furnace has a distinct advantage because these have no opportunity to combine with combustion products of fuel as they do in the reverberatory or blast furnace. Practice at the Outokumpu Smelter in Finland has demonstrated the value of the electric furnace in copper matting because it accomplishes successful conversion of sulphur dioxide to the liquid form. The superheating due to electric arcs ought to serve a useful purpose in copper smelting by vaporizing elements that would be of value if thus separated and which would be made to pay for the extra costs, if any, of using electric power.

5. ANTIMONY. There is substantially no production of metallic antimony in this country, the price range of antimony and the large amount of secondary antimonial lead do not make a project for the production of antimony specially attractive. It would, nevertheless, represent a noncompetitive industry, so far as this country is concerned. Very considerable deposits of antimony ores have been developed in the Yellow Pine District of Idaho, also there might be made available considerable amounts of antimony residues and intermediates from lead smelting plants. What is needed, then, is an economical process for the leaching and electrodeposition of antimony metal.

Alunite.—Besides these major possibilities for the development of electrometallurgical industries in connection with Government power projects, there are certain special problems of mineral treatment which may find a solution by the Bureau with cheap electric energy. One of these is the treatment of Utah alunite. Many processes that have possibilities have been proposed, and the Bureau has attempted independently to find a commercial method. Complete answer has not as yet been found, but two partial solutions have been worked out. In the first of these the silica and potash of the ore are volatilized in the electric furnace and collected as an extremely fine silica powder and potassium oxide, K_2O . The alumina remains in the residue and may be subjected to purification by dry or wet processes. It is thought that the silica formed by this process, very fine and perfectly white, may have a commercial value and would offset the disadvantages of high-siliceous ore. The potash is obtained in the most concentrated form possible for shipment to market. It would, of course, require neutralization with sulphuric or phosphoric acid for use in fertilizer.

Another process for treating alunite starts from a most interesting observa-

tion made by a member of the Metallurgical Division of the Bureau. He found that if alunite is fused with borax a definite separation into two layers is obtained. The lower layer is practically pure potassium sulphate and represents an almost complete separation of this constituent from the alunite. The other layer of borax glass contains the alumina, silica, and other impurities. A separation of the alumina from this glass requires a wet method.

Tungsten.—There are important deposits of tungsten ores in Nevada and California, mostly in the form of scheelite, now being shipped as concentrates to eastern plants for the manufacture of high-speed tool steel. Such steel may be made in electric furnaces, and its manufacture is usually accomplished by the addition of ferro-tungsten. Ferro-tungsten for this purpose may also be made in electric furnaces.

The metallurgical details of these processes are well known, and an industry based on them apparently could be readily established.

Future Work.—All of the principal possibilities discussed are under continued investigation. Largely through the efforts of Congressman Scrugham, the Bureau obtained this year an appropriation of \$84,400 for an electrometallurgical experiment station at Boulder City. A suitable building has been purchased from the Six Companies, Inc., and work has been started to convert it into an electrometallurgical laboratory on a pilot plant scale. Work will go forward at this station on some of the experimentations mentioned, especially the treatment of chromite ores and other ores yielding ferro-alloys.

In addition to this program of electrometallurgical investigation, the Bureau has been cooperating for several months in the work at Washington State College, previously referred to. This work is devoted largely to the development of possible processes for the extraction of magnesium metal from magnesite ores and the production of magnesium alloys.

Summarizing the discussion up to this point, the mineral industry stands to get very little, so far as we can now foresee, from the vast power projects now under construction unless money is spent in research. We believe only a moderate annual amount is required. But whatever the necessary cost, the Bureau should be enabled to carry out this work. If the problems described are solved, and there is every reason to believe that they can be solved, the mineral industry may confidently expect that the Federal power projects will bring them electrolytic manganese of high purity as a commercial metal in the price range of other common nonferrous metals; that they will give them carbon-free metallic chromium or ferro-chrome from domestic deposits; that we may look forward to a slow development of a magnesium industry as new alloys are found and their uses established; that a supply of domestic antimony of high purity may be made available.

OTHER TECHNOLOGIC POSSIBILITIES

The following possibilities are suggested on the assumption that power at much reduced prices can be delivered at points at a distance from the Government plants. Most of them could use secondary or dump power at low prices supplied over existing lines. A variety of nonmetal mineral enterprises can be envisioned that would consume cheap power if it is made available by the Government and the transmission systems.

Refractories.—The fierce heat of the electric furnace makes possible the preparation of refractories that require unusually high temperatures. Fused magnesia is finding increasing use because the high-temperature form of magnesia, periclase, has many desirable properties. It also commands prices that would stand a considerable freight charge to distant markets if power costs are low. Besides the magnesite in Washington, there are deposits of it in California, and of brucite in Nevada.

Fused mullite, made by melting down the kyanite, andalusite, dumortierite, and sillimanite of California, Nevada, Arizona, and Colorado, is already finding a growing use, both as grains in the "grog" for making up refractory brick and for cast shapes.

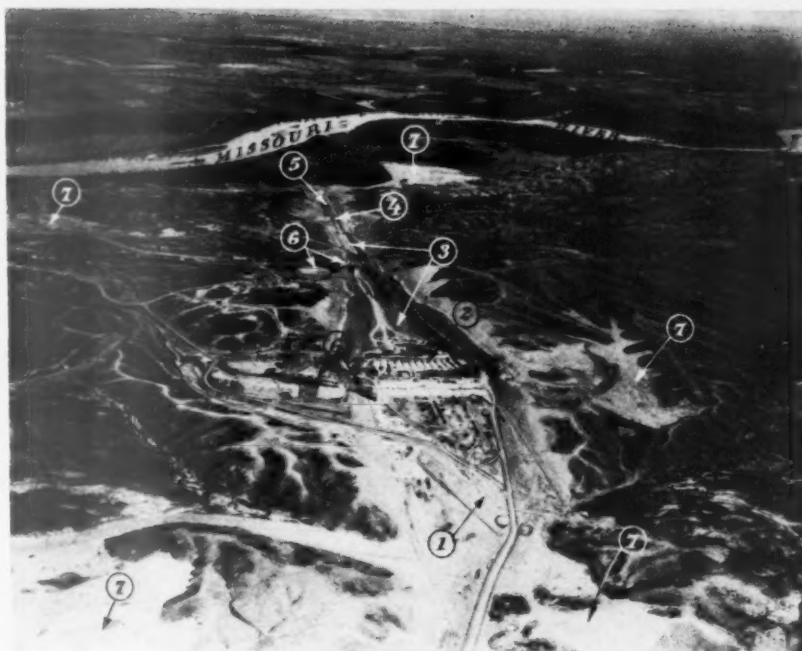
Electrically burned brick and tile of all kinds should be considered as promising for the utilization of low-priced dump power.

Fused Silica.—Fused quartz articles are more easily made if the quartz used for them is first fused into proper grains with elimination of all gases and other causes of opalescence. Pure silica may be smelted into prefused grains for this purpose. The low coefficient of expansion of fused silica adapts it to many industrial uses that would require considerable tonnages. It is refractory to about the same degree as fire clay. It is dense, nonporous and gas-tight, resistant to the common acids and to most chemicals. It would be in demand on a large scale in chemical manufacturing plants if obtainable at a reduced cost.

Glass.—Electric fusion of glass industrially has not yet been made a success, but sufficiently cheap power might induce trial of its commercial possibilities. There is a large demand for glass containers for fruit and other products in the Pacific coast states.

Porcelain.—Electrically burned porcelain has been under investigation in Government laboratories, and this application of electric power promises commercial success. Clays equal in quality to those that have given excellent results are plentiful in Washington, Idaho, and near the Boulder Dam.

Phosphates.—The Idaho and Wyoming phosphate rock is a long way from market, but is, nevertheless, moving in reasonably large tonnages. The phosphorus in phosphate rock can be converted in the electric furnace into the elemental form for shipment to distant consuming centers. Triple superphosphate made from the electric furnace phosphoric acid is another product that seems feasible.



Fort Peck Project

Electrolytic iron.—Electrolytic iron is a product costing about as much as electrolytic zinc to produce and is worth the price of zinc, especially if melted down without contamination, as can be done in the electric furnace. Iron ores are available in California and Utah. Several hundred thousand tons a year of highly purified iron is used as transformer sheets.

Chemical Industries.—In the chemical industries, scores of things might be made, but we shall consider only a few which can be manufactured from raw materials known to be plentiful.

Sodium sulphide can be made by reduction of sodium sulphate in electric furnaces. It has been done in Italy and experimentally in Russia. Sodium sulphate is available in saline lakes and deposits from Washington to Arizona. It is in large demand for the paper industry. The sodium sulphide can be easily converted into sodium carbonate by blowing steam and carbon dioxide through the melt or through a solution of sodium sulphide.

Sodium chloride (salt) is being electrolysed on Puget Sound and on San Francisco Bay to produce caustic soda and chlorine gas. It may also be possible to produce sodium chlorate at a price that would permit its use as a weed killer, and supply a growing demand. Cheap power and conveniently located limestone might result in establishment of an atmospheric nitrate plant.

Water Purification.—Throughout the Southwest, the natural waters tend to have too high salinity to be desirable or even safe for consumption. In times of low flow the Colorado River itself is likely to carry considerably over 1,000 parts salinity per million of water. In

the oil-producing districts the water issuing from the well with the oil is commonly salty, and its disposal constitutes a problem. Electrolytic purification of water tends to abstract this salinity from the main body of the water and to concentrate it in a small volume. The alkaline and acid products of this electrolysis might even be recovered and marketed separately. While electrolysis has not been perfected to the point where it can produce irrigation water economically enough for anything but citrus land, and even there the costs are not assuring, it should be of interest to communities that need good household water at, say, \$60 per acre-foot in the city mains. The electrolysis incidentally sterilizes the water.

As a slight digression, electrolysis of water will probably encourage electrolysis of sewage to sterilize it and recover organic material of value as fertilizer.

CONCLUSION

In this discussion the conclusion has been drawn that the most important use the mineral industry can make of the new supplies of Federal electric power is in the establishment of new processes for the treatment of low-grade ores and minerals not now utilized, particularly those that have been deficient in production in this country and are strategically important. From the point of view of the power projects, electrometallurgy promises to be an important consumer of power when some of the present unknown factors are solved by competent scientific research. It is hoped, of course, that utilization of power from the big installations may be upon such a basis that existing investments may not be

(Concluded on page 52)

RECENT LEGISLATION—

What It Means to Mining*

THE task which your Program Committee has assigned to me today is not a simple one. The committee has asked me to give you a report on recent Federal legislation, and what it means to the mining industry.

Now, of course, mining is one of our two great basic wealth-producing activities—agriculture being the other—and all legislation that affects our general welfare and prosperity has a direct effect upon the mineral industry. An industry such as ours, which forms the source of half the nation's wealth, which employs in production and processing about 1,700,000 people, which directly or indirectly furnishes the livelihood of some 25,000,000 people, which furnishes 55 percent of the total freight revenue of the railroads, and which is an important industry in two-thirds of the counties of the United States, cannot escape its full share of the benefits or burdens which Congress may see fit to impose upon productive activity in this country.

Here in the West we realize more fully the importance of the mining industry and what it means to our national welfare. But those of us who are fortunate enough to be actively engaged in mining, prefer to carry on their operations in the mines, rather than in the marble corridors of Washington, and usually do not have either the time or the facilities to follow all that is taking place at the Nation's capital. All too often bills which are harmful to the mining industry may receive favorable consideration and even be enacted into law, before the mine operator realizes what is going on, or understands how these measures may add to the difficulties of operating his mines and meeting his payrolls.

Small wonder that this situation exists, when we consider the mere physical volume of work thrown in the lap of each session of Congress. The Seventy-fourth Congress in its two regular sessions fell short by only 256 of having 20,000 bills and resolutions for consideration. The exact number was 19,744,

and of these approximately 800 were enacted into law at each session. Many of these new laws gave authority to departments or bureaus of the Federal Government to issue regulations which themselves have the force of law, with severe penalties for violations. To wade through such a mass of printed material, to determine all the points at which it impinges upon his business, is practically a hopeless task for the man who is devoting his full energy to operating his mine. As a specific example, consider the extreme hardships which have been suffered by a not inconsiderable number of law-abiding, conscientious gold miners, through failure to understand and comply with the gold license requirements of the past two years. Still more hopeless for the active mine operator is likely to be the problem of watching the day-by-day or hour-by-hour developments in pending legislation, and endeavoring to guide it along proper channels.

To assist the industry in keeping track of matters of such vital interest, each of the bills and resolutions introduced in the Seventy-fourth Congress was analyzed in our office, and a report issued on those having particular interest to mining; further bulletins were issued covering all committee hearings and subsequent action. These reports were made on several hundred bills at each session, but for purposes of this report today, of course, we must sift these down still further to a few of the most important. Fortunately, also, the convention has already had an opportunity to discuss such important subjects as—

The 1936 Tax Law;
The Social Security Act;
Reciprocal Tariffs;
Silicosis; and
Gold and Silver Legislation.

By JULIAN D. CONOVER †

I shall try only to hit the high spots concerning these measures and touch on certain items of legislation relating to labor, business regulation, stream pollution, the public domain, etc.

CORPORATION INCOME TAX

The Undistributed Profits Tax of 1936 invokes a new and startling method of corporate income taxation. It bears with particular severity upon the small, struggling mining enterprise which must of necessity use its earnings to develop and equip the property, to build a mill, to pay off indebtedness, or royalties under a lease-in-bond. The additional taxes assessed as a penalty for the use of earnings in this traditional manner are a heavy burden on new mines and those in the development stage. Most of the great mines of the West have been built into the great enterprises and employers of labor which they now are through the reinvestment of earnings, a procedure vitally important to the development of additional mines, but upon which a penalty tax is now assessed.

Enactment of this law was forced over the combined opposition of the mining and other industries, in the closing days of the 74th Congress. Amendments designed to soften its harshness were swept aside lest they decrease the expected tax yield. One of these, urged by Senator Adams of Colorado, would have provided exemption from the Undistributed Profits Tax for earnings devoted to capital expenditures, including mill building, shaft sinking and mine development. An amendment by Senator Pittman, of Nevada, to permit periodic redeclarations of capital stock value, and thus prevent the "whip-sawing" of mines and other enterprises whose earnings may fluctuate widely, between the

* Address before Annual Metal Mining Convention, The American Mining Congress, Denver, Colo., October 1, 1936.

† Secretary, American Mining Congress.

capital stock tax on the one hand and excess profits tax on the other, was also voted down.

One amendment of material value to industry, which was originated and urged by the representatives of mining, was adopted: This permits liquidation of subsidiary corporations without taxing the "gain" due to increase in value of the subsidiary's assets; it thus permits the simplification of corporate structures which has become so important as a result of the abolition of consolidated returns and of the new taxes upon inter-corporate dividends.

Prospects for 1937 are for further revisions of the Federal tax structure. Careful study is being given this subject by experts for the Treasury and for the congressional committees, and there is much talk of a general revision of the income tax laws regardless of the election outcome. In such a revision, which incidentally would be the fifth since 1932, it again becomes most important that the mining industry make a full presentation of its needs, and endeavor to remove the hardships and inequities of the present law.

SOCIAL SECURITY

In any discussion of taxes the Social Security Act must inevitably come in for consideration. This act is the greatest single tax measure ever enacted. Tax collections upon pay rolls, upon reaching the maximum figure of 9 percent in 1949, will produce approximately \$3,000,000,000 annually. The reserves for old age benefits, which reach the colossal figure of \$47,000,000,000 by 1980 (or about \$12,000,000,000 more than our present national debt) must be invested in interest-bearing Government obligations. Now, of course, the only way to pay interest on such obligations is through more taxes, and an additional \$1,500,000,000 will be required for this purpose, making a total annual requirement of some \$4,500,000,000. It is obvious that a series of tremendous economic and political problems will be created if the present financial provisions of the act are retained.

Undoubtedly, the constitutionality of various features of the act will be tested

in the near future; in fact, the unemployment compensation provisions are already in the courts. Recent decisions of the Supreme Court lead many eminent lawyers to believe that the tax for this purpose will be thrown out, as being not a true tax but a means adopted by the Federal Government to force the states to adopt legislation which the Federal Government itself has no power to enact.

Of particular interest at the present time are the plans for registration of the 26,000,000 workers covered by the old-age pensions provisions of the act. To provide proper means of identification for such a vast number, many experts believe that complete finger printing and Bertillon measurements are essential; however, such procedure has been vigorously opposed by organized labor and is not at present contemplated by the Social Security Board. The problem of registration of workmen in isolated mining localities has been taken up with the board, and assurances received that mail registration, at least of new employees, will be arranged under such conditions.

LABOR MEASURES

The *National Labor Relations Act*, commonly known as the Wagner Act, was discussed in some detail at Chicago last year. As you know, it replaced and reinforced the famous Section 7A of the NRA, relating to collective bargaining.

The Wagner Act is designed to prevent interference on the part of employers with the action of employees in organizing themselves and carrying on collective bargaining with their employers. To this end it prohibits certain so-called "unfair labor practices" on the part of employers, but it is noteworthy that it does not prohibit similar unfair practices on the part of fellow employees or outside labor organizations. In fact, it explicitly legalizes the closed shop and requires all employees to be bound by the representatives of the majority, subject only to the right of minorities to "present grievances." A clause barring coercion or intimidation of employees "from

any source" was opposed by organized labor and was rejected by Congress.

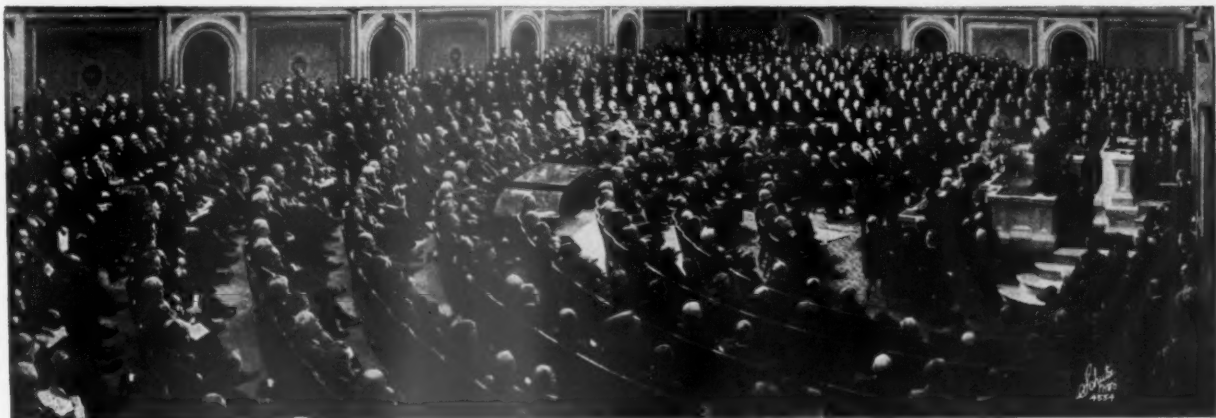
During the hearings on this bill, in which the representatives of mining took an active part, it was pointed out that its enactment would result in labor disturbances and in many cases would seriously disturb the peaceful and cooperative relationships which have existed between employers and employees. Since its enactment, such results have materialized in many localities.

The act has been found unconstitutional in a number of the lower courts—both on the ground that labor relations in mining, manufacturing and similar operations are essentially intrastate in character, having only a remote or indirect effect upon interstate commerce and hence not being subject to Federal jurisdiction; and upon the ground that the act's mandatory requirement concerning "bargaining" by an employer take away his freedom of contract, which is a property right guaranteed by the Fifth Amendment and which cannot be taken from him without due process of law. These questions have still to come before the Supreme Court for final decision.

The *Walsh-Healey Government Contracts Act* was forced through Congress by advocates of the wage, hour and working conditions provisions of the NRA. Previously it had been tabled by a House committee, an action which would ordinarily mean its death; but after the Guffey Coal Act (which provided complete Federal control of the bituminous coal industry as to both labor and marketing practices) had been found unconstitutional, the Walsh-Healey bill was revived, was forced through the House, and then through the Senate by a parliamentary trick in the closing days of the session.

This act applies to all materials supplied to and contracted for the United States Government or any of its agencies.

It requires the person furnishing such materials to observe a maximum eight-hour day and forty-hour week, and minimum wages in accordance with determinations to be made by the Secretary of Labor. It thus renews government control of hours and wages over that



House and Senate in Joint Session

very large proportion of all industry which is concerned with government business. As written, it applies only to the primary supplier or contractor and not to those from whom he purchases his materials or to subcontractors; for example, a mining company or other concern, not selling directly to the Government, but supplying ore or other raw material to a concern which is selling to the Government, does not come within the restrictions of the Act. The Act is deemed inadequate in certain respects by its proponents, and efforts to broaden it are to be expected in the coming session of Congress.

Thirty-hour week bills have been with us at each of the last four sessions, and it has been necessary for us to make strong presentations as to the effect which any such measure would have upon the mining industry. These bills would make mandatory a maximum six-hour day and 30-hour week in all industry, *without reduction in daily or weekly rates of pay*. Of course, they would mean greatly increased costs, as we have discussed on previous occasions. In many mines, where the standard 8-hour shift means an effective working time of only 6 to 6½ hours, a reduction of two hours in working time, with continued payment of the same rate per shift, would create an impossible situation and force a cessation of operations.

Recent developments indicate that renewed efforts for enactment of a 30-hour week bill may be made next year. Representative Connery, of Massachusetts, chairman of the House Labor Committee, has stated publicly that he will secure the enactment of such a bill, and Senator Black, of Alabama, author and ardent advocate of 30-hour week legislation, has now succeeded to the chairmanship of the Senate Committee on Education and Labor, which has charge of such measures. In the last three sessions of Congress, these bills appear to have been used as trading stock or threats to secure enactment of other regulatory labor bills.

Of all the various labor bills, the most sweeping has been the O'Mahoney *Federal Licensing Bill*. This bill, sponsored by the American Federation of Labor, has not yet been the subject of committee hearings. It would require any corporation engaged in interstate or foreign commerce, or producing articles which enter such commerce, to obtain a Federal license. Conditions of such license would include the requirement that in arriving at rates of pay, hours of work and other conditions of employment, the employer *exhaust all possibilities* of collective bargaining with representatives of recognized employee organizations; also the submission of detailed data concerning production costs and profits and any other questions at issue, for confidential use of employee representatives. Use of police authorities to protect strike-breakers would automatically void the license. Surpluses of corporations would not be permitted to exceed a specified percent of the capital stock, and

whenever dividends exceeded 10 percent a profit sharing plan for employees would be compulsory. The bill contains some 78 pages of detailed requirements, of which these that I have cited are representative. Senator O'Mahoney announced some time ago that hearings would be called on this bill, but thus far no date has been set and there has not been any organized pressure for action.

REGULATION OF INDUSTRY AND BUSINESS

The foregoing comments indicate certain phases of the constantly recurring efforts to revive the NRA methods of governmental regulation.

Special bills to set up so-called "little NRA's" for control of particular industries have been actively urged, not only for coal, but for oil, gas, textiles and structural steel. In addition, the Council for Industrial Progress, set up following the ill-starred Major Berry conference of last December, and a number of other special agencies are either studying the history of code operations or preparing plans for some new form of industry regulation. Constitutional amendments, to permit Federal regulation of hours, wages, working conditions and the general conduct of industry have also been urged in various quarters.

In the field of business practices and selling methods, other measures have been receiving consideration. A law of possible revolutionary effect which was enacted this year is the so-called "Chain Store" or Robinson-Patman Act, which amends the terms of the Clayton Act concerning price differentials.

The Robinson-Patman Act is an extremely complicated law, the effects of which are far from clear, and concerning which the Federal Trade Commission has declined to issue any explanatory regulations. An amendment exempting crude minerals and metals was sponsored by the American Mining Congress, was introduced by Senator King, of Utah, and was adopted by the Senate. However proponents of the bill insisted that there was no intention that it apply to natural resource industries and that the amendment was unnecessary, and in the conference committee, on which Senator King, because of his duties as acting chairman of the Finance Committee, was unable to serve, the amendment was thrown out. Thus far, mining operations have been conducted very much as they were before the law was passed, and it probably will not be possible, until court decisions have been handed down interpreting the Act, to determine to what extent it affects the sale of mineral products.

A subject of special concern to metal mining in the chain-store bill, as reported to the House last session, was its "anti-basing point" provision. This would have prohibited the use of basing-points for quoting prices, such as are used in selling lead or zinc on a St. Louis or New York basis, and similar long-established practices. In their place, it would have required each sale to be quoted f.o.b. smelter or other point of shipment. Such a radical departure

would, of course, result in great confusion in the sale of mine products. It would involve special hardship on hundreds of ore shippers who now sell on a contract basis, with settlement based on average St. Louis or New York prices. The whole basis of these contracts would be wiped out if metal prices could no longer be quoted under a standard price system, and it would be difficult to devise any method by which the shipper could receive prompt and satisfactory settlement for his ores.

The effect of this clause was explained to members of a special group handling the "chain-store" bill in the House of Representatives, with the result that when the Rules Committee granted a rule for floor consideration, it was on condition that the Anti-Basing Point Provision be eliminated. Such action was then taken on the floor of the House, and since the Senate Bill did not have a similar provision, it does not appear in the law as enacted. However, an independent bill on this subject was also introduced by Senator Wheeler, of Montana and extensive hearings held. Senator Wheeler has indicated that further hearings will be held next year and action pressed to prohibit all basing-point methods of pricing. Although this subject again has many complex ramifications, it is obvious that the effect upon our mining industry would be distinctly hurtful, and that proper action should be taken to prevent such damage.

STREAM POLLUTION

Of vital interest to mining was the legislation considered this past year on the subject of stream pollution. We all know that conflicts over the right to use the streams for disposal of mine wastes have occurred in many communities, but the questions at issue thus far have been settled locally, without interference from the Federal Government.

This last winter two drastic Federal stream pollution bills were introduced by Senator Loneragan, of Connecticut. One of these would make it a criminal offense to deposit waste material of any sort whatever in navigable waters or their tributaries. The other would provide that the National Resources Committee be made a permanent agency, giving it extensive powers and duties, including the division of the country into sanitary water districts and the setting up of "standards of purity" for the waters of each district, with power to promulgate regulations and to enforce such standards by court action.

Strong opposition to these bills was registered at the hearings, including a series of statements organized by the American Mining Congress in behalf of the mineral industries. We took the position that the control of stream pollution is distinctly a state and local problem—one which should be regulated by these local agencies, supplemented by interstate compacts where necessary, but which does not call for intervention by the Federal Government; that the appropriate field of the Federal Government is that of scientific investigation and

assistance to industries and local authorities. As a matter of fact no two streams are alike; every stream presents its own peculiar and distinct problems, and to set up a Federal bureaucracy to regulate all of these streams, from the mountain tops to the sea, is simply an impossible undertaking, which would entail endless confusion and hardship. It was pointed out that these bills, if enacted and enforced, would necessarily shut down many mining and metallurgical activities upon which communities of thousands of people are dependent, and which are essential to supply the metals and fuels for our industrial civilization.

In addition to the Loneragan bills, a number of measures were introduced providing that studies of stream pollution problems be made by various Federal agencies, and one of these might have been enacted, had it not been for the opposition of Senator Loneragan. The Connecticut Senator took the position that if any stream pollution legislation was to be passed, his own bills should receive consideration, and he has since issued public statements to the effect that these bills will be actively pressed for passage next year and he anticipates favorable action. This type of legislation is urged by organizations interested in the protection of fish and other wild life, an objective with which all of us are naturally sympathetic, but it is obvious that the practical needs of our industry must also receive consideration.

SILICOSIS

This subject was fully and very ably treated by Dr. Lanza and Dr. Brown on Tuesday, and I shall touch on it only briefly. Silicosis has recently been discussed a good deal in Washington, in connection with a resolution introduced last February by Representative Marcantonio, of New York. This resolution called for an investigation of health conditions in connection with tunneling and mining operations and other employments in which dust conditions might be present. During the hearings a distorted picture of a tunnel project in West Virginia was given sensational publicity, in fact it received much more attention from the press than did the scientific testimony on the subject which was ably presented by officials of the United States Bureau of Mines and the Public Health Service.

A resolution calling for a congressional investigation with a view towards so-called "remedial legislation" was in the Rules Committee of the House at the time of adjournment. Another resolution by Senator Murray, of Montana, was reported on by a Senate committee, which expressed doubt as to whether the Federal Government had any power to legislate on this subject. Meanwhile, a general survey of the subject was undertaken by the Secretary of Labor. A pre-

liminary conference under her auspices took place in February, at which we had an opportunity to describe the preventive work that has been carried on by the mining industries; and a further conference, with considerably larger attendance, was held in May. At the second conference a series of committees were appointed to study the medical and engineering methods of prevention and the economic, legal, and insurance aspects of silicosis. If the Department of Labor is able to develop and coordinate the reports of these committees, there may be some attempt made toward the enactment of dust disease control legislation in the Seventy-fifth Congress. In the meantime, the United States Bureau of Mines, the Federal Bureau of Public Health, and many of the state public health officials, with full cooperation from the management of industries, are continuing a constructive treatment of dust control problems along lines which, no doubt, will continue to be productive of worth-while results.

TRANSFER OF PUBLIC DOMAIN TO THE STATES

In the Federal Domain states of the West, discussion has gone on for many years over the proposal that the Government turn over to these states the land

now administered under the Federal Domain. In the last Congress two bills were introduced by Senator Hatch, of New Mexico, and Representative Ayers, of Montana, providing for such action. Under these proposals, however, the Federal Government would retain title to the minerals contained in these lands, presumably to be administered under a leasing system such as now applies to oil, coal, and potash. Under such conditions, the general feeling seems to be that the return to the states of the surface of the land would entail a burden of administrative cost which would be in excess of any revenues which the states might derive. No action was taken on these bills, but if similar legislation is introduced in the Seventy-fifth Congress, the mining industry in the public domain states should prepare to present a united front in the expression of its desires as to passage or nonpassage of such bills.

In closing, may we urge upon the mining industry as a whole the importance of expressing to your representatives in Congress your views upon legislation that may be pending. We have heard a great deal of late about "lobbying" activities, and undoubtedly certain things have been done, in a desire to influence legislation, that were most reprehensible; but that does not change the fact that every one of us who is going to be hurt by a proposed law, or who feels that a law is going to be bad for the country, has a perfect right, either individually or through organized effort, to present facts and express views to those who represent us in our law-making body. How else are they going to know what the effect of proposed legislation will be, and determine whether to support or oppose it?

I can assure you that those in Washington who understand the problems of mining will do all that they properly can to help in securing sound and constructive legislation, with adequate recognition of the needs of the mining industry.

● MYRON C. TAYLOR, chairman of the United States Steel Corp., disclosed plans for a large development plan for the Tennessee Coal, Iron & Railroad Co., subsidiary of the U. S. Steel Corp., and voiced his confidence that "the revival which we have seen and are witnessing in its earlier stages is the beginning of a progressive resumption of full operation of America's vast productive enterprises."

William A. Irvin, president of U. S. Steel Corp., discussed the details of the plan.

The T. C. I. & R. expansion involves approximately \$29,000,000.



World Markets for Non-Ferrous Metals*

By W. R. INGALLS†

THIS is a subject that might be treated in a variety of ways, but I suppose that present interest in it is centered upon the existing situation and the immediate outlook. With this idea in mind, I shall avoid the historical, except in so far as recent events have contributed toward the development of the existing situation.

The primary thought must be that the people of the civilized world are emerging from a broad economic depression, which is occurring in different degrees and with some differences in chronology in the several countries. An examination of the production indices of the U. S. Department of Commerce shows that a grand rise culminated in 1928-29, a little earlier in some countries than in others. In all countries, including the United States, the rise was of substantially the same order. From the peak there was a precipitate decline, which in general bottomed about the middle of 1932. This appears in the graphs for the United States, Great Britain, and France. In Germany the bottom was registered a few months earlier, and in Canada and Poland a few months later. However, all economists are in substantial agreement that, broadly speaking, the nadir occurred about the middle of 1932. I have seen no statistical evidences conflicting with that conclusion.

Since the middle of 1932 there has been broad recovery, generally speaking, which has been swiftest and most powerful in Great Britain and Germany, while decidedly erratic and distinctly lagging in the United States. The graph for Canada is similar to that for the United States, but not quite so jagged. France is the only one of the major countries that is divergent. Following a moderate rise from the middle of 1932 to the middle of 1933, its production fell to another bottom in 1935.

We may represent these events in

other ways, one of which is by a comparison of national incomes. An estimate of the income of the people of Great Britain in 1935 was 4.446 billion of pounds sterling, which was a little more than 1 percent higher than their income in 1929. The American people in 1935 had an income of \$53,000,000,000, which was only about 65 percent of what it was in 1929. This is an impressive exhibition of the degree of recovery in Great Britain and current prosperity, as compared with the American record. The two estimates are made on similar lines, and therefore are reliably comparable. In respect of the income of the American people in 1935, the estimates of the U. S. Department of Commerce and my own prior estimate are in perfect harmony.

I am fearful of becoming tedious in drawing these broad economic pictures, but they are fundamental. The graphs for the production and consumption of all the metals, ferrous and nonferrous, fall substantially into the same slots, and consequently are the markets for them determined. With a broad rise in the economics of Great Britain we should expect to find increased requirements for metals and, in fact, we do so. Likewise in other countries.

When we come to a consideration of conditions in detail, and especially in connection with single metals, we are bound to pay attention to disturbances and dislocations, some of them natural and some of them artificial, that may be of powerful effect. Among such things that have happened during the last 10 years have been the broad introduction of the process of differential flotation, bringing in new and rich deposits of lead and zinc ore; the extension of improved methods for beneficiating lead and zinc ores; the development of new and great copper deposits at Sudbury and in northern Rhodesia; increase in the spirit of nationalism leading the several countries of Europe to try to be self-supplying of their own requirements for metals, which is exhibited in the erection of tariff barriers, the building of new

plants, the encouragement of the use of substitutes for scarce metals, the support of employment by subsidizing production, etc.

Going beyond these broad suggestions, I may particularize as to some important things that have been happening recently in respect of the nonferrous metals.

As to copper: Great Britain has become able to obtain all of its requirements from within the British Empire and has instituted extensive refining at home. Electrolytic copper refining has been instituted on a large scale in Belgium and Germany, depriving American refiners of a great deal of work that they used to do. The deprivation has been increased by the institution of refining in Canada, whose blister copper formerly came to the United States. Our domestic custom smelting and refining has therefore been largely impaired. Our export trade in primary fabrications—e. g., rod, sheet, etc.—has been also impaired through the tendency of other countries to do that work for themselves; e. g., Canada, which has created a large manufacturing industry at home.

Copper, as the highest in cost among the three principal nonferrous metals, is, *ipso facto*, a target for competition. In electrical transmission aluminum is a serious competitor. In Europe the high-tension lines are chiefly of aluminum. The British grid was built with aluminum. In America there has been a considerable use of aluminum.

In alloys we see an increased use of die-cast zinc in the form of an alloy containing only a small proportion of copper vs. something like two-thirds in the average brass. The use of die-cast zinc alloy for automobile radiator grills was no substitution, but there are other employments wherein substitution is direct.

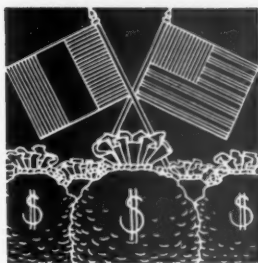
Nonmetallic substances, such as some of the plastics, may become substitutes for brass.

Some broad industrial change, such as the substitution of auto-bus transportation for trolley cars, as has been going on among us, may not only abolish a use for copper but also bring back a lot of copper junk into the market.

On the other hand, we have had some noteworthy gains, among which the use of copper and brass pipe for plumbing has been very important. So has the

* Presented at the Annual Metal Mining Convention, Western Division, American Mining Congress, September 28, 1935.

† Director, American Bureau of Metal Statistics.



increased use of mechanical refrigeration. A general substitution of Diesel electrics for switching yard and branch-line steam locomotives might become an important factor.

Some of these possibilities have been exploited much more in America than they have in Europe. Compared with ourselves, the Europeans do not manufacture many automobiles, and have not yet gone in for electrical refrigeration, and they still make an extensive use of lead for plumbing, which we do not.

I am abstaining from controversial situations in this consideration, confining myself to statements of fact. There is little doubt that Europe is capable of using a good deal more copper than it does, if it has the will and the means to do so.

* * * * *

As to lead: Lead production, like that of copper, is well integrated; i. e., in the main it is made by companies that produce the ore and smelt and refine the metal, and the number of them is not large, wherefore it is not difficult to arrange a *modus vivendi* among foreign producers. As will hereinafter be observed, this has predominantly in mind the thought of lead, letting zinc, where produced as a joint product, go more or less as it will. An obstacle to orderliness in lead is reflux of battery scrap, a large quantity of lead that is discharged for consumption being not really consumed, but going into storage batteries, whence the scrap returns in something like 30 months, and in immense quantity. This is far more of a factor in America than elsewhere, for the reason that the number of automobiles in use by us is largely more than anywhere else.

The principal uses for lead in modern economy are for pigment, storage batteries, cable covering, and in pipe and sheet for building construction and use in chemical engineering. In 1929 those uses absorbed 70 percent of the American total. The other uses of lead are diverse, and among them there is nothing to excite imagination, except the new use for tempering gasoline, which probably is now near a climax. We do not have a corresponding breakdown for European countries, but the indications are that in them the four major uses absorb a larger proportion of the total than with us, but with some important differences. Of the latter, the one that is especially noteworthy is the far greater use of lead as sheet and pipe. Lead pipe for domestic water service is still employed extensively in Great Britain,

whereas in America but little is now used for that purpose. It follows that building construction and the use of lead are more closely associated in Europe than here, and that a factor in the recent improvement in foreign lead consumption has been the increased house-building in Great Britain and Germany.

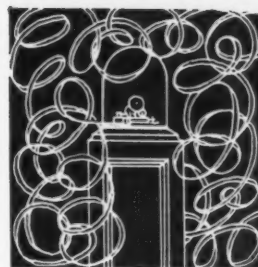
Among our major uses for lead we must recognize some competitive vulnerabilities. White lead for pigment is assailed by the white zincs of several varieties, especially for inside painting, and has suffered substantially. Red lead, heretofore immune, is threatened by zinc dust. The lead that goes into storage batteries quickly comes back to the extent of 75 percent. Lead-covered cables for electric light and power service are in competition with nonleaded cables. The substitution of auto-bus transportation for electric trolley cars has released a good deal of lead-covered feed cable. Brass and copper pipe have largely replaced lead in domestic plumbing. For these reasons, among others, the outlook for increased lead consumption seems to be more favorable abroad than at home.

However, the great checks to lead consumption in the United States since 1929 have been the decline in building construction and upkeep, and the diminished use by the telephone and public utility companies. With revival in the demand for those purposes, which is already discernible, the domestic consumption of lead, with its implication of a sound market, will improve.

As to zinc: The flotation process brought into production numerous deposits of mixed sulphide ores, some of which were in reasonable proximity to tidewater and some of which were remote. In respect of the latter, there was often availability of water power and possibility of producing spelter on the spot by means of the electrolytic process. Thus we have seen production of spelter instituted in the interior of Africa, 1,500 miles from seaport, and in another instance almost on the shores of Hudson Bay. With improvement in blende roasting, that may be conducted autogenously, it may be possible to produce spelter in even more preposterous places, without the use of any carbonaceous fuel, whereas formerly it was the theory that zinc ore must be carried to coal.

One of the results of this has been a constantly increasing proportion of electrolytic zinc in the world's total, especially outside of the United States. In 1935 electrolytic zinc constituted 42.5 percent of the virgin production ex-U. S. A. If we add to this the production of spelter by reflux-refining the proportion of high-grade spelter, 99.95 to 99.99, becomes even larger. The offering of this fine zinc has been adverse to the market for common spelter.

There have been other important results. The world's production of spelter was formerly by custom smelters, to a major extent. The production has more and more been becoming integrated; i. e., by producers who own their own mines and do their own beneficiating.



Another result has been an increase in the intimacy of lead and zinc, for the great mines that have come into production have zinc and lead in association, wherefore if a blende concentrate be produced, so must be a galena, and vice versa. In this there is perhaps a disposition to consider zinc as a by-product and to regulate production according to lead. If this be not true in all instances, it is in some, and manifestly that does not promote the position of zinc.

Underlying all of this is the condition that the great zinc-lead mines of foreign countries—such mines as Burma, Sullivan, Buchans, Trepca, and those of Broken Hill—are blessed with ore of high grade. In a survey of the world's zinc resources that I made in 1931, I tabulated 179,000,000 tons of developed ore in foreign countries, showing an average grade of 13 percent zinc and 7.3 percent lead, whereas a tabulation of about 180,000,000 tons (including the great tonnage of the Tri-State District) in the United States showed an average of 5 percent zinc and 1.25 percent lead. It follows from this that zinc and lead can be produced more cheaply abroad than in the United States, for superior to all elements of cost of mining, milling, etc., is the grade of the original ore.

A great problem in the zinc industry abroad is the fundamental discord in its organization. There is a great group of integrated producers. Outside of them are smelters who have to buy their ore wholly or in part; and a group of great miners who have to sell their ore. Their interests are so divergent that it is difficult to make any composition among them. In addition to this complication is the national one that inspires the Russians, Germans, and Italians to produce their own requirements.

A metallurgical cartel dissolved at the end of 1934. There have been recent conversations on the subject of a renewal, but the outlook is not promising. Following the dissolution of the last cartel the price for spelter rose substantially, the statistical position being good, but the advance invited increased production from the mines, the price receded and has settled down to about the level of 1932, when the average was about £13.5.

In the meanwhile there has been rather a brilliant increase in consumption, which from the low level of 617,500 metric tons in 1932 rose steadily to 924,700 in 1935 and has increased still further in 1936, these figures referring to consumption ex-U. S. A. There is a

good outlook for a continuing increase in consumption. To a large extent, zinc unites with copper in making brass, and what affects one metal also affects the other. Besides that, zinc has promising new uses of its own. In Europe a large use of rolled zinc occurs, upward of 25 percent of the consumption being in that form, and especially for building construction, whereas in this country our use in that way is negligible. On the other hand, Europe as yet makes very little use of zinc for die-castings, battery cans, fruit-jar tops, and some miscellanies, for which purposes in this country we use a great deal. The European producers and manufacturers, who have visited us to study these subjects, see an opportunity for themselves in retaining all of their old uses and to them adding some of ours.

It is a reasonable opinion that with a continuance of the economic trend upward the outlook for improvement in zinc consumption is good. The outlook for improvement in price is not so good, owing to the discord among the producers that I have previously explained. Improvement in consumption may be expressed, therefore, in the ability to market more zinc at a low price rather than to divide the pie by agreement and get some gravy instead of spilling it.

I have dwelled at length upon the foreign positions, for the reason that, to a large extent, they have become controlling of our own in the matter of prices. Not for a great many years has this country been an exporter of lead and zinc except during some abnormal periods, like that of the Great War, and the following readjustment. We have not exported any domestic lead for a long time. What appears in our export statistics is foreign lead brought hither for smelting and refining, but with the transfer of refining to Mexico that business has largely disappeared. Nor have we recently exported spelter except as the product of foreign ores smelted in bond. Our concern has been rather to keep out foreign lead and zinc with the aid of our tariffs. At several times we have been close to a neutral point. So long, therefore, as the London prices are low they are a restraint upon our prices, no matter how strongly our prices might want to go up if they were free to do so.

In copper, also, we now have a protective tariff, but whereas the tariff on lead is of old age, as also is that on zinc, so that we have adjusted ourselves to them and our industries have been firmly organized on their bases, the tariff on copper is so new that we are not sure

how it is going to work in the long run. Its purpose is, of course, to keep out foreign copper and produce an immunity from competition. So far the differential between New York and London has ranged from 1 cent per pound to zero. We have been very far from being in any danger that foreign copper might step over the barrier. On the other hand, some domestic producers have exported copper, accepting a lower price for the sake of larger scales, which we can hardly imagine happening in lead or zinc.

There was so much controversy in respect of putting a tariff on copper, that some concessions had to be made, which provided for the admission of Cuban ore duty free, and also copper in ore usable as flux, up to a total of 15,000 tons per annum. Also we had in this country a rather considerable quantity of copper of foreign origin in stock, which could be entered duty free or could be exported at the option of the owner.

Around the middle of this year we had a rather paradoxical occurrence of an advance in the foreign price pushing up our domestic price, apparently out of the thought that if copper were selling higher abroad it ought to do so here.

In the early part of 1935 copper production outside of the United States was running wild and threatening disaster, notwithstanding a high rate of consumption, which kept on increasing. This led to a curtailment agreement among the principal producers, especially those of Chile, Katanga, and Rhodesia. Other producers refrained from taking advantage of the composition, even if free to do so, while some were probably physically unable to do so, anyhow. The result of this has been, since the middle of 1935, a remarkably steady production at the rate of about 95,000 tons per month. On the other hand, there has been a steady increase in consumption, which during 1936 has been running around 100,000 tons per month. Consequently there has been a steady reduction in accumulated stocks, and producers considered it safe to sanction a small increase in the rate of production, beginning August 1, 1936. They have learned that it is more profitable to make an adjusted production and sell it for 9 cents or better than to run wild, accumulate stocks, and sell competitively around 5 cents.

Obviously the survival of such an arrangement depends upon American producers keeping out of the foreign market. In fact, our largest American interests in copper are concerned with a preservation of order in it, inasmuch as they are foreign producers as well as domestic.

Both here and abroad there has been some difference in opinion as to price and policy. One school has been adverse from letting the price rise any further, out of fear of loss of business to competitive substitutes. The other school has had the thought that even at 10 cents copper is cheap, and that fear of competition is exaggerated.

As a matter of economic fact, there

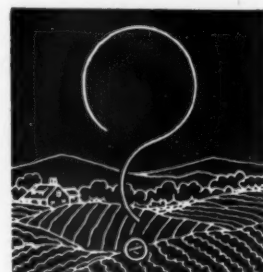
has been a steadily rising consumption since 1932, and that has been attended with a rising price. That is classic behavior when there is a broad economic trend upward. The increase in foreign consumption has been mainly industrial, associated with increased housebuilding, shipbuilding, electrification, etc.; in other words, with general advance in the scale of living. Germany has been doing some armament. The wars in Manchuria and Ethiopia do not appear to have required much copper. On top of a well-maintained industrial absorption, Great Britain has this year entered upon a serious program of armament, and that has doubtless had more or less to do with the market.

Prior to 1929 our domestic surplus of copper available for export had been gradually diminishing, and if we should recover the rate of domestic consumption that occurred in that year we should probably have no copper for export, inasmuch as our producing capacity, estimated at about 1,000,000 tons per year, would be fully required for the satisfaction of our own needs. With the present rate of consumption much below that of 1929, we might increase our rate of production and have an export surplus, but saleable only in competition with foreign copper, which would be ruinous for everyone. We may imagine, therefore, that the American price for copper will run along in substantial harmony with the European price, the tariff having no effect beyond excluding foreign competition in the domestic market. We may reasonably expect that our domestic price for lead and for zinc will be limited in any upward movement by the foreign price, but in the opposite direction our own peculiar conditions may be determining.

At the end of August, when I am writing this, the London price for lead is £17.25, which at the exchange rate of about \$5.03 figures to 3½ cents per pound. An addition of duty of 2½ cents comes to 6 cents per pound. However, the New York price for lead is only 4.60 cents. At the same time the London price for common spelter is £13.5, which figures to 3.03 cents, and plus 1.75 cents duty comes to 4.78 cents, while the New York price is 5.17½ cents, corresponding with 4.80 cents St. Louis.

These computations are only broadly illustrative, for actual comparison is more intricate. We have to consider the subject of freights and other costs, which may be one thing if trans-Atlantic shipment is required and another thing if

(Concluded on page 55)





Internal Revenue Building, Washington, D. C.

Wheels of Government

TO THE EAST of the Capitol, in majestic dignity, stands the new Supreme Court Building of the United States, where, on October 5, the opening session of the fall term considered the cases subject to the action of the court. The court was expected to grant or refuse reviews in nearly 300 cases appealed from lower courts. Following the list of orders on review requests, the nine Justices will hear arguments in 56 disputes which are now on the calendar. The hearings will be followed by two weeks of recess, in which opinions will be prepared on cases already heard. Of the recent legislation involved in the ap-

peals are measures such as the Wagner National Labor Relations Act, the Public Utility Holding Company Act, the Silver Profits Tax, the Gold Clause, the Securities Act, and the Railroad Labor Act. It is interesting to note that in past rulings on NRA and the Guffey Coal Act, the court has held that the Federal Government cannot conduct regulatory activity of the type contemplated in these acts, for the reason that it will constitute a violation of states' rights. In the decision against the New York Minimum Wage Law for Women, the court held the law to be a violation of the right of contract. Decisions on the National

Labor Relations Act are not expected until after the holidays.

With the return of many department and bureau chiefs from vacation-land, the past month has brought forth action on a number of the enactments of the last Congress. Administrative procedure has been slow, but there is now a decided push for results.

In handling the Government Contracts (Walsh-Healey) Act, Secretary of Labor Perkins has caused regulations to be published and has appointed a temporary board to hold hearings and make findings on questions arising under the act. The board consists of Frank Healy, chairman,

recently with the office of the General Solicitor for the Department of Labor; Hugh L. Kerwin, Director of the Conciliation Division of the Department of Labor; and Telfair Knight, counsel for the Textile Labor Relations Division of the Department of Labor. The administrative order which named the board indicated the temporary nature of that body and charged its members with the work of passing upon requests for exceptions and exemptions from the provisions of the act. Such requests are expected to involve the establishment of overtime rates, complaints on violations of the act, establishment of prevailing minimum wage rates, and consideration of appeals from rulings of other agencies affecting the operations of the act. The board now has before it a request for a 90-day reprieve from a number of phases of the act. This request has been filed by the cotton textile industry, and the decision of the board is anticipated at an early date. The industry has asked for an exemption from the clause which prohibits employment of children under 18 years of age. It is understood that the representatives of the cotton textile industry anticipate that minors over 16 years will be permitted to work in their industry. The request further would exempt from the provisions of the act various employees, such as shop crews, engineers, electricians, firemen, office and supervisory stations, shipping, watching and other outside groups, leaving only those employees actually engaged in spinning and weaving under the 8-hour day and 40-hour week and the time and one-half for overtime provisions. The exemptions which have been requested are identical with those which were operative under the NRA cotton textile code. Proponents of the Government Contracts Act now realize that unless the act is administered in a reasonable and broad way that manufacturers and producers of materials may proceed through jobbers and commission men, with the result that the act will in all practical effects become null and void.

The Social Security Board is endeavoring to carry on with its preparation for the registration, or enumeration, of the 26 or 27 million workers who will be affected by the old-age benefits section of the act. While the actual registration will not be attempted until after the November election, forms and cards are being prepared, and it is expected that the administrative procedure will be very lively after November. None of the detail as to registration dates and methods have been made officially available, for the reason that many of the things affecting these matters are still under debate within the organization of the Social Security Board. It has been announced that the Post Office Department will handle the distribution of the registration forms as well as the mechanics of the registration. The chairman of the board, ex-Governor John G. Winant, of New Hampshire, resigned during the month as a result of a speech by Presidential Candidate Landon, attacking the act and its administration. It is an-

nounced that ex-Governor Winant will take the stump in the political campaign in defense of the Social Security Act.

On October 2 the Federal Trade Commission took its first formal action in the administration of the Robinson-Patman Act by issuing complaints naming five respondent companies as violators of the act. Two cheese companies, two linoleum companies, and Montgomery Ward and Company were the subjects of the complaints. Respondents were charged with discrimination in price between different purchasers of their products, with the effect of lessening and injuring competition between their companies and other manufacturers and distributors of similar products. They were also charged with the lessening of competition between customers wherein some of their customers received more favored prices.

There have been rumblings indicating attempts to restore the NRA in fact or in principle. Reports are being prepared for submission in December to the President by a group now assembling case histories under the NRA codes and by Major Berry's group, which will list recommendations for a future plan of industrial cooperation. Many believe that the two reports will point out what the authors believe to be a usable idea of management-labor-consumer cooperation under Federal supervision, and that the work may result in the writing of a new bill or bills which will attempt to put such a system into effect.

The Senate committee investigating labor espionage, under the chairmanship of Senator La Follette, of Wisconsin, has conducted public hearings involving testimony regarding specific examples of such activity in a number of manufacturing plants. Particular attention has been paid to the Railway Audit Inspection Company, as the officers of this agency were indicted by a District of Columbia grand jury for contempt because they refused to appear before the investigating committee.

The American Federation of Labor and Committee for Industrial Organization controversy has been trending toward a peaceable solution ever since the expulsion date of September 5, at which time the 10 unions comprising the CIO lost their membership in the A. F. of L. It is reported that the ousted unions will ask the national convention of the A. F. of L., which meets in Tampa, Fla., this fall, for reinstatement, and it is believed that this will result in a plan whereby the A. F. of L. will recognize industrial unions and charter new organizations of this nature, just as they have recognized the United Mine Workers of America for many years.

After months of work, including hearings and conferences, the Federal Trade Commission recently made public a proposed set of trade practice rules for the fertilizer industry. The producers of raw materials which enter into fertilizer took no part in these conferences, and it is understood that the Federal Trade Commission has no thought of bringing any industry under the rules unless the representatives thereof apply of their

own volition. The closing date of October 9 for the filing of expressions of interest or non-interest has been extended to December 8.

● WHILE it is still too early to consider legislative possibilities of the next Congress, presence of many Senators and Congressmen in Washington the past few weeks has disclosed that a number of controversial measures before previous Congresses will be reintroduced. Among the better known of these are the Wheeler-Utterback anti-basing point bill, the Copeland food and drug bill, a new Guffey bituminous coal bill, a new Patman anti-price discrimination bill extending the scope of the act to prevent manufacturers engaging in retail business, revision of the Social Security Act, a new Wheeler-Rayburn Federal trade amendments act broadening the power of the commission to act upon its own initiative, a broad stream-pollution bill, and several other measures of lesser importance.*

● ACTIVE plans for the December meeting of the Council of Industrial Progress were announced by Maj. George L. Berry, Coordinator for Industrial Cooperation.

The Berry group has been gathering reports from labor and industry on a desirable future program. It achieved organization status after its big meeting last December, attended by representatives of labor and industry with the former very much in the majority. That meeting was heralded as an attempt to revive the NRA. Subsequently the council was organized. It numbers some 200 representatives of labor and business, and for several months has been issuing reports, showing wage and hour conditions in various industries from 1914 to 1933. It has also sponsored a speaking campaign with the avowed purpose of presenting to labor, industry, and chamber of commerce groups reasons necessitating an adequate national program in the major industries.

The group now assembling histories of the codes and wage and hour conditions under them for preparation of a summarized report consists of 35 former NRA employees, operating under an interdepartmental committee headed by Secretaries Perkins, Wallace, and Roper.

Both groups were created by Executive order of the President and operate from emergency funds made available in the relief appropriation last year.

Major Berry made public a letter sent to members of the council, urging attendance at the December meeting, where a "definite program" would be laid before the gathering. The letter asks that a definite program for future action in "the intolerable situation precipitated by the Supreme Court's interpretation of the law" be prepared.*

* (From Weekly Bulletin, American Mining Congress.)

Of All Things . . .

A new record for length of service in Congress is being set by Senator Morris Sheppard, of Texas, recently nominated by a big majority, in that state tantamount to election. . . . The Senator is the dean of the Congress, having entered in 1902 as a Congressman to succeed his father. . . . He served 12 years as a Congressman and then came to the Senate, where he has been since, piling up 34 years of uninterrupted service. . . . Next to him and dean of the Senate is William Edgar Borah, of Idaho, who rounds out 30 years in January of continuous time in the upper house. . . . Dean of the House is Adolph J. Sabath, who came there the same time Senator Borah came to the Senate. . . . Two other old timers sure to be back are Robert Doughton, of North Carolina, and Edward T. Taylor, of Colorado, both entering their fifteenth term and twenty-ninth year of House service. . . .

Some unkind critics, remembering America's bitter foe in the Revolutionary war, have dubbed the Secretary of Agriculture Lord Corn-Wallace. . . . It's a certainty no Indian tribe will adopt him by the name of Chief Cornplanter. . . .

Not long ago workmen around the Capitol discovered in a subterranean room, two marble bathtubs, unused for half a century. . . . It's probably the place where Government matters are cleaned up. . . .

The Supreme Court is back on the bench. . . . Good thing the New Deal was in office. . . . Otherwise the justices might find time hanging heavy on their hands with little to do. . . .

Well, anyway the farmer isn't the forgotten man these days. . . . Both parties have bent over backwards in professing eternal devotion and a continuation of cash checks. . . . But the farmer wonders whether he will be loved in December as he was in September. . . .

Harry Hopkins's WPA employees—we were almost going to call them workers—may be \$40 a month men, but that doesn't mean that the big boss has to ride around in a \$40 automobile. . . . The Government furnishes Mr. Hopkins with two cars. . . . The smaller is a \$2,600 eight-cylinder affair which he uses for the longer inspection trips of WPA projects. . . . The other is the "town" car . . . a special 12-cylinder job, fitted with two radios . . . a sound-proof glass windshield separating chauffeur and occupants so that private conferences can be carried out . . . a sliding table

on which to serve lunch . . . tires, which are ordered direct from the factory so that they are fresh stock, are changed frequently. . . . Still, a man who distributes five or six billion dollars can't be expected to do it in a Ford. . . .

A news story tells about a millionaire's estate of eighty million dollars paying the Government fifty-three million in taxes. . . . It's obvious that what this country needs is more millionaires to die for it. . . .

What with more taxes and all, it costs 20 percent more to live now than it did a year ago. . . . And it was hardly worth living then. . . .

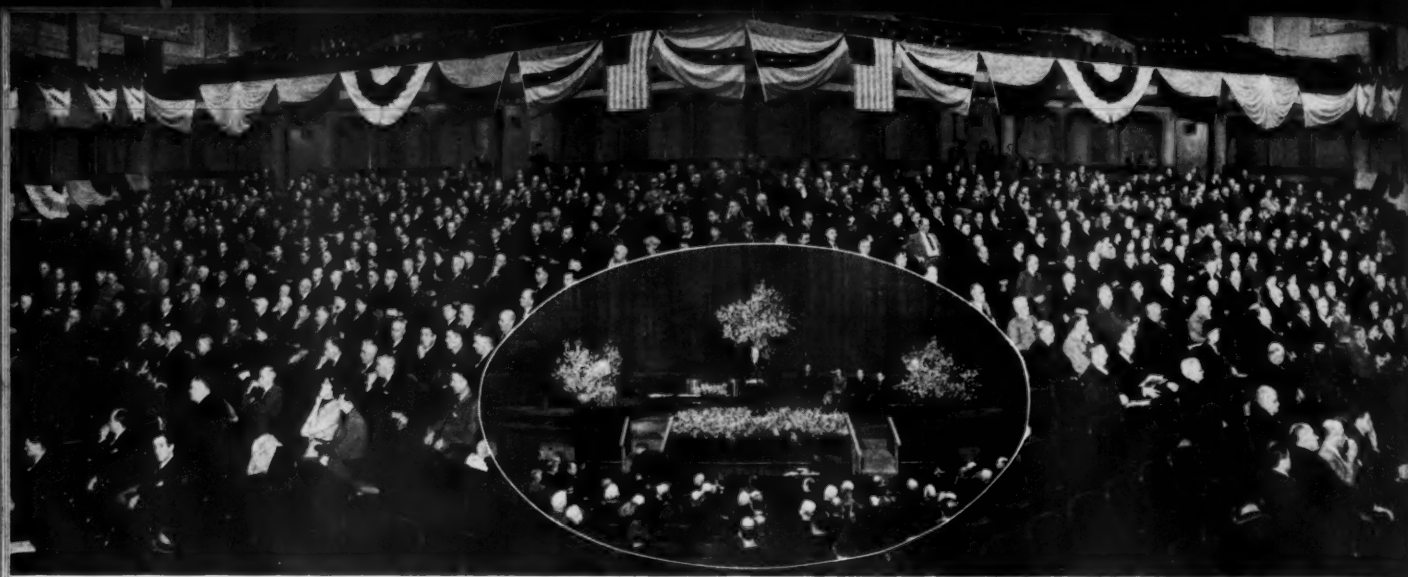
It's reported that the Democratic chieftains are anxious to find a new campaign song . . . that "Happy Days Are Here Again" is time worn. . . . How about "Oh Promise Me"? . . .

Official automobiles in Washington, not counting many of those privately owned by department chiefs, number in excess of 500. . . . It isn't the original cost that the taxpayer finds onerous . . . the daily fuel and upkeep would keep the entire Government running back in the early days of the Republic. . . .

One thing about the Chinese, even politics doesn't make them forget their politeness. . . . The Republicans claim the Chinese vote of Newark. . . . The Democrats contested that claim. . . . Wu Kim, a Democrat and war veteran, canvassed the situation for the Democrats. . . . He reported: . . . "It was my great privilege to assist the Democratic party in its canvass. I restricted my humble efforts to the sector inhabited by many of my race. There I found sentiments for President Roosevelt as overwhelming as the Yangtze waters. . . . It is with regret that I find it necessary to dispute the untenable claims of Mr. William P. Lee, honorable head of the Chinese Division of the Republican party." . . . The best part of it is that the Chinese, with a few exceptions, didn't have a vote.

There's a big to-do about collective bargaining for labor. . . . A better idea would probably be collective bargaining for taxpayers. . . .





Metal Mine Officials Meet at Denver

COLORADO and Denver lived up to their reputation for hospitality during the recent annual meeting of the Western Division of the American Mining Congress, held at the City Auditorium, Denver, Colo., September 28 to October 3. From the opening day to the final pounding of the gavel, enthusiasm and interest attended every session of the meeting. This convention and exposition, which is rapidly becoming the high spot of the year for the metal mining industries, was outstanding in every respect. The attendance was fully representative of all branches of the industry and every metal producing district. The speakers and the topics presented merited and received the cooperation and interest of the entire industry, and the entertainment features set a standard which will be difficult to surpass.

The convention was opened informally on Sunday afternoon, September 27, by former Governor and Mrs. Jesse F. McDonald who were official hosts for the convention and who arranged a get-together party in order that the local committees and the officials of the organization might become better acquainted before the convention started.

Attendance at the meeting was excellent, the total registration being estimated at more than 1,200. Delegates came from the far East, from Georgia, Alabama and Tennessee, from California, Washington, British Columbia, Idaho, Montana and Texas, as well as from the immediate Rocky Mountain mineral districts and the Mississippi Valley region, including the Tri-State lead and zinc fields, Illinois, Minnesota and Michigan.

The local Committee on Arrangements

presented an excellent example of what may be accomplished by cooperation and coordinated effort. This committee, which had under its direction welcome to delegates, entertainment features, annual dinner and ladies entertainment, ably lived up to the tradition of the west from the first to the last welcoming and departing handclasp. The committee was under the general direction of Judge James Owen, well known Denver attorney and mining man, who was assisted by more than 50 Coloradans.

Robert S. Palmer, secretary of the Colorado Chapter of the American Mining Congress and the Colorado Mining Association, served as chief coordinator of local activities and handled all details in connection with entertainment features, trips, etc. Mrs. Palmer served as coordinator of the ladies' entertainment features, and delegates returned to their homes fully aware of the real charm of the western people.

The entertainment features of the convention were most delightful. Beginning with a get-together party on Monday evening, September 28, followed by a world's championship hand drilling contest and a dinner dance at the Denver Country Club on the 29th, the annual dinner on the 30th, and an old-time barbecue and western party on October 1, with entertainment at the local clubs and many features planned by individual members of the Colorado committee, the convention offered an unusual amount of entertainment of a very high order.

The convention opened officially Monday morning, September 28, with the Honorable Jesse F. McDonald, president of the Downtown Mines Company and

chairman of the board of governors of the Western Division, in the chair. Colonel Willard T. Chevalier, vice president of McGraw-Hill Publishing Company, presented an inspirational talk upon "Today's Problems." Dr. Walter Renton Ingalls, director of the American Bureau of Metal Statistics, prepared for the convention a paper on "World Markets for Non-Ferrous Metals," which in Dr. Ingalls' absence was presented to the convention by F. E. Wormser, secretary of the Lead Industries Association. This paper appears in full in this issue of the JOURNAL. Governor McDonald then appointed the Resolutions Committee, to which all resolutions were referred for consideration.

A high light of Monday's program was the honorary luncheon given to James F. Callbreath, secretary emeritus of the American Mining Congress, in appreciation of his 34 years of service to the organization. The luncheon was presided over by Donald A. Callahan of Wallace, Idaho, who told the delegates something of the work Mr. Callbreath performed in laying the foundation for the splendid organization that exists today. Mr. Callbreath responded with brief remarks on the early history of the organization. The Honorable Edwin C. Johnson, governor of the state of Colorado, extended a cordial welcome to all delegates and was followed by the Honorable Benjamin F. Stapleton, mayor of the city of Denver. Howard I. Young, president of the American Mining Congress, Stanly A. Easton, chairman of the program committee, and Governor McDonald, chairman of the Western Division, each spoke for the organization in response to the

welcoming addresses. The Colorado Mining Association paid a special compliment to Mrs. Callbreath, Mrs. Young, Mrs. Julian D. Conover, wife of the secretary of the American Mining Congress, and Mrs. E. R. Coombes, assistant to the secretary, presenting each with a beautiful bouquet of flowers.

W. Mont Ferry, vice president and managing director of the Silver King Coalition Mines Company of Utah, presided at the second session. Dr. John Wellington Finch, director of the United States Bureau of Mines, presented a paper on "Power Developments and Metal Mining," which appears in full in this issue of the JOURNAL. A particularly interesting feature of this session was the symposium upon "Recent Developments in Western Mining." W. J. Coulter, general manager of the Climax Molybdenum Company, presented a splendid paper upon the development of that property. Charles H. Segerstrom, president of the Nevada-Massachusetts Company, presented developments in the tungsten industry, and potash was presented by J. J. Bourquin of the United States Geological Survey. An operating paper—"Mechanical Mucking Underground versus Slushing"—was presented by A. C. Stoddard of the Inspiration Consolidated Copper Company, and appears in this issue of the JOURNAL.

The Tuesday sessions presented an unusually interesting array of papers. The morning session was presided over by Brent N. Rickard, manager of the El Paso Smelting Works, American Smelting and Refining Company. The afternoon session was presided over by Charles H. Segerstrom, president of the Carson Hill Gold Mining Corporation. Among the topics presented at the morning session were "Mining Roads as Part of Public Works Program," by Dr. M. F. Coolbaugh, president of the Colorado School of Mines; "Practical Problems of the Social Security Act," by the Honorable Vincent M. Miles, member of the Social Security Board; and "Reciprocal Trade Agreements and the Mineral Industry," by Herbert Wilson Smith of the Union Carbide and Carbon Corporation.



Stanley A. Easton
Chairman, Program
Committee



Howard I. Young
President, American Mining
Congress



Jas. Owen
Chairman, Committee on
Arrangements

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"In all time there never has been and there never will be a tax law, either local or Federal, satisfactory, or cordially welcome to the people. Perhaps it is better so. Why do I make that statement? I make it for the reason that the objection to paying taxes resulted in the two revolutions of history that gave to the Anglo Saxon race their great Charters of Liberty, the Magna Charta of Runnymede and the Constitution of the United States. Had the forefathers been willing supinely to pay the exorbitant taxes imposed by a spend-thrift King, or those levied without representation of the taxpayer, we would today be without those guarantees of freedom contained in the historic documents mentioned. * * *

"Perhaps the most serious handicap of these companies (gold, silver and base metals) in the way of taxation, at the present moment, is the undistributed profits tax law enacted by the recent Congress. Without discussion in its broader aspects, of the merits or demerits of that law, it can be said with emphasis and certainty that it should be repealed or modified insofar as it applies to corporations engaged in prospecting for gold and silver and in placing properties valuable for such metals upon a permanent producing basis. It is no exaggeration to say that fully 100,000,000 of our entire population are without any knowledge whatsoever of how lode mining of gold and silver is carried on. It may also be said without reflection upon the good faith of any one, that the taxing powers possess but limited knowledge upon the subject. * * *

"While it is true that a few large, well financed companies are probably producing the larger portion of old gold and silver, it is equally true that the discovery and early development of gold and silver bearing veins are initiated and carried on by thousands of individuals and corporations meagerly financed. Such individuals and corporations, as were the old prospectors of other days, are the backbone of the industry. Without their optimism, energy and activity the industry would stagnate and perish. * * *

"I repeat, that if the doors of metal mining are to remain open to those of small or limited means, this law should be repealed insofar at least as it pertains to corporations in search of the yellow and white metal."

—John T. Barnett, Pres., Mountain Producers Corp.
Before Annual Meeting, Western Division, A. M. C.

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Senator Alva B. Adams

"The tax money spent to feed, clothe and house America's unemployed may be a small price to pay for the results in public peace and safety. * * * Taxes in the United States are lower than in any other first class nation. * * * We forget what we get for our taxes—roads, schools, irrigation works, the mining rights on which the mining industry is based, liberty, freedom, and a better and safer land. There may be some exaggeration of the painful effects of the undistributed profits tax * * * but it is unsound from the standpoint of industry and of ultimate government revenue."

—Senator Alva B. Adams,
of Colorado
Before Annual Meeting,
Western Division, A. M. C.

A symposium of Lake Superior iron ore operating papers was read by title, including "Applications of Magnetic Surveying to Exploration," and "Structural Drilling as Applied in Western Mesaba Mining Practice." All of these papers will appear in coming issues of the JOURNAL.

One of the real high lights of the Tuesday session was a discussion of "Health Problems in Mining" and "Equipment and Methods for Determining Air Dustiness." The former subject was presented by Dr. A. J. Lanza of the Metropolitan Life Insurance Company and the latter by Carlton E. Brown of the United States Bureau of Mines. A paper on the "Legal Liability in Western States for Inter-

"Within the next 15 months, in excess of 6,000,000 individuals, partnerships and corporations will prepare and file income, excess profits and other tax returns, under the provisions of the Revenue Act of 1936. More than 90 percent of these returns will be prepared correctly by or for the taxpayers concerned and the tax paid within the time provided by law. The remaining 10 percent of the returns will require intensive examination and special collection effort. While these latter returns bulk small in percentage of numbers they will involve a large amount of revenue and create many interesting administrative problems. * * *

"More recently, however, the Bureau and taxpayers have shown more inclination to treat taxation as a practical matter. Reason and common sense dictate that, in most instances, the revenue may as well be protected and tax liability as fairly determined by an amicable and expeditious settlement of doubtful questions as by long and expensive litigation. This trend has been accelerated through the delegation of broader discretionary power to the Internal Revenue agents in charge of the field offices, the conference groups in Washington, the technical staff of the Commissioner's Office, and the Appeals Division of the Assistant General Counsel's Office. * * *

"During the fiscal year 1936, agreements to deficiency assessments were increased from the 1935 figure of 123,857 cases to 166,251 cases, which is the largest total of agreements ever secured in the history of the Bureau. * * *

"During the fiscal year 1936, it was found necessary to examine approximately 450,000 income and profits tax returns in the field. These examinations produced recommended additional assessments of \$355,000,000. Past records indicate that at least 70 percent of these recommended assessments, ultimately, will be assessed and collected. The Bureau believes that it would be negligent in its duty to the vast majority of taxpayers who correctly report their incomes if it did not make every effort to see that their less careful or misguided brother taxpayers did not escape their fair share of the tax obligation.

"In administering the Revenue Act of 1936, the Bureau will continue its policy of close investigation of all returns which appear to be in error. It will make every effort to eliminate tax evasion and to make sure that taxpayers' efforts to avoid tax payments legally are safely on the right side of the line that separates avoidance from evasion. * * *

"In conclusion, I should like to summarize the policies of the Bureau as you may expect to find them applied to the administration of the Revenue Act of 1936:

"The Bureau will strive for greater efficiency in its routine task of serving the taxpayer with forms, and in giving him aid in the preparation of his returns.

"It will strive to maintain an adequately trained, honest and courteous personnel.

"It will continue its efforts to accelerate the examination of returns and the final determination of disputed tax liabilities.

"It will continue its decentralization and settlement programs, so long as they produce commendable results.

"It will cooperate to the fullest extent with those taxpayers who are in financial difficulty.

"It will continue its efforts to prevent fraud and unlawful tax evasion.

"It will welcome the advice and counsel of all taxpayers and their representatives irrespective of whether they are critical or approach it in a spirit of helpful cooperation."

—Milton E. Carter, Assistant to the Commissioner of Internal Revenue
Before the Annual Meeting, Western Division, A. M. C.

ference with Underground Waters by Mining," prepared by Bauer E. Kramer of Oakland, California, was read by title and will appear in a forthcoming issue of the JOURNAL.

The Wednesday morning session, presided over by Judge James Owen, was devoted exclusively to a discussion of the 1936 Tax Law; John T. Barnett, prominent Denver attorney, presenting "Tax Problems of Western Minerals"; Ells-

worth C. Alvord, Washington attorney, discussing "Legal Features of the 1936 Revenue Act"; and Henry B. Fernald, chairman of the executive tax committee of the American Mining Congress, presenting "Practical Problems under the 1936 Revenue Act."

William B. Daly, manager of mines, Anaconda Copper Mining Company, was scheduled to serve as chairman of the sixth session but was unable to attend



Senator Key Pittman

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"Our mountains are untouched as yet. * * * We want a return of silver as domestic money and that will come. All nations of the world used it before the war, including the United States. We will ultimately bring back silver to its natural price of \$1.29 per ounce."

—Senator Key Pittman,
of Nevada
Before the Annual Meeting,
Western Division, A. M. C.

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the meeting. Robert M. Linton, southern California operator and well known mining man, substituted for Mr. Daly. The Honorable William H. King, senator from Utah, continued the discussion of Federal taxation, with which he has been so intimately associated as ranking member of the Senate Finance Committee. Among other well-considered recommendations, Senator King urged repeal of the present capital gains tax. Carl R. Gray, president of the Union Pacific Railroad Company, dean of transcontinental railroad presidents, discussed "The Mineral Industry and Transportation," emphasizing the importance of the products of mines in the freight revenues of American railroads. Three papers on iron ore preparation and utilization were read by title, including "Concentration of Minnesota Low-Grade Iron Ores," by Grover J. Holt of Butler Bros.; "Present Tendencies in Iron Ore Preparation," by A. J. Gleason, of Pickands Mather & Co.; and "Cast Iron Paving Blocks," by E. W. Davis of the University of Minnesota. All of these papers will appear in com-

ing issues of the JOURNAL. An interesting paper was presented by Dr. M. M. Leighton, chief, State Geological Survey Division of the state of Illinois, in which he proposed a mineral states committee to serve as a collecting agency for reliable and unusual information concerning the mineral industries. A spirited discussion ensued, and the matter was then referred to the Board of Directors of the American Mining Congress for consideration.

The last day of the convention presented another program which attracted unusual interest and the largest attendance of the entire week. The morning session was presided over by D. D. Mofat, vice president of the Utah Copper Company. Julian D. Conover, secretary of the American Mining Congress, presented a paper on "Recent Legislation—What it Means to Mining," summarizing action taken by the 74th Congress and its effect upon the mining industries. This paper, which is reproduced in this issue, started a considerable amount of discussion. It was followed by "The Need for United Action," by D. A. Callahan, of Idaho, who made an earnest plea for cooperation by all men of the mining industries in presenting the needs of the industry to state and national legislatures. Among those participating in the ensuing discussion were Robert M. Searls of San Francisco; J. F. McCarthy of Wallace, Idaho; A. Scott Thompson of Miami, Oklahoma, and Roy Miller of Houston, Tex. The Honorable Alva B. Adams, senator from Colorado, discussed national issues, criticizing the 1936 tax law and making an eloquent plea for what he termed "peace-time patriotism."

Stanly A. Easton, president of the Bunker Hill and Sullivan Mining and Concentrating Company, served as chairman for the final session Thursday afternoon. The Honorable James M. Landis, chairman of the Securities and Exchange Commission, presented "Mine Financing as Viewed by Securities and Exchange Commission," a subject of special interest to many of those in attendance. Carl J. Trauerman, president of the Mining Association of Montana, discussed Mr. Landis' paper from the standpoint of the "primary" or undeveloped mining property. The Honorable Key Pittman, senator from Nevada, who had left his home state by airplane at 4 o'clock that morning in order to be present, delivered a stirring address on the gold and silver questions. A round-table discussion of government and industry, with R. C. Allen, vice president of Oglebay, Norton & Co., as discussion leader, which was scheduled to close the convention, was postponed in view of the lateness of the hour. Mr. Allen's views will be presented in an early edition of this JOURNAL.

Conclusion of the meeting was marked by adoption, without a dissenting vote, of the report of the Resolutions Committee, presented by the chairman, Judge James Owen of Denver. The full text of the declaration of policy thus adopted is given elsewhere in this JOURNAL.

The high point of the whole convention was the annual dinner held on Wednesday evening, September 30, at the Brown Palace Hotel and attended by more than 700 delegates. The guest speaker was the Honorable Herbert Hoover, former president of the United States and a distinguished mining man, who received a veritable ovation from his fellow mining men. Mr. Hoover's speech, which was broadcast over the powerful KOA station, appears in part in this issue. He was presented to the delegates by John T. Barnett, distinguished attorney and Democratic leader of Colorado, who officiated as toastmaster. Mr. Barnett also introduced the following



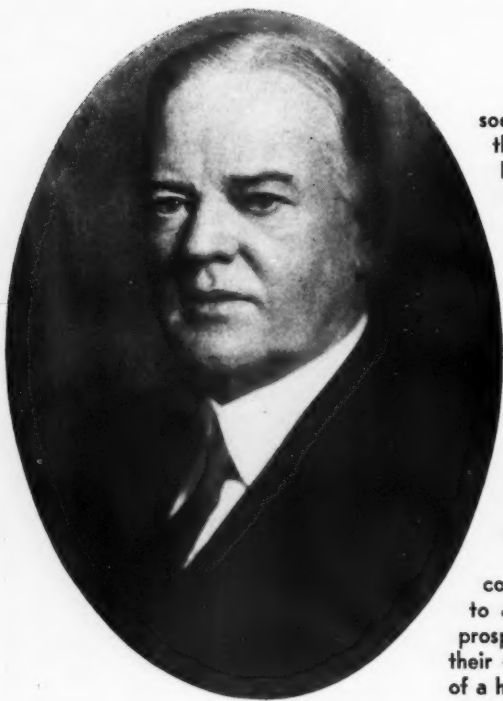
Senator William H. King

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"I deplore improvident expenditures in government and the fallacy that tax money from the rich can support the poor. * * * We are abandoning that fine individualism that was the basis of this greatest republic in the world. Many Americans seem to forget that we have a dual system of government—that the Federal Government's authority is only that which the people were willing to surrender to it under the grants of the Constitution. * * * I regret that Congress has used its taxing powers as a means to regulate. * * * I cite the outlawed AAA and the Guffey coal act as results of a regrettable doctrine of the omnipotence of Congress."

—Senator Wm. H. King
of Utah
Before the Annual Meeting,
Western Division, A. M. C.

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"It has been a sort of theory that taxes should not be used to effect social or economic ends. That idea has been more honored in speech than in action, as witness the tariff ever since George Washington. Moreover, all taxes are an economic and social burden no matter how light they may be. But when taxation rises to the volume of from 15 percent to 20 percent of the national income then the method of them may powerfully advance or retard social or economic forces no matter how they are levied. We might just as well frankly face the fact and try to direct them first into the least damage, and second, into producing the most benevolent effects possible. * * *

"One of the distinguishing features of the recent corporation tax is its tax on undistributed profits. That in fact often becomes a tax upon such profits as are applied to other more useful national purposes than dividends to stockholders. The theoretical purpose is to impale the few tax dodgers who have not been impaled already upon the barbs of many entanglements. But by this law barriers are erected which stop the honest and necessary activities of a multitude of honest men.

"There is no better instance of this than the metal industry. The continuation of our metal supply and the expansion of the industry rest to a considerable degree upon the new discoveries and energies of the prospector and small operator. They are seldom able to develop and equip their discoveries without some initial outside capital. Ninety-nine times out of a hundred these men must put their ventures in corporate form in order to define the interests and liabilities of themselves and those who find the money. Certainly this sort of corporation is not the manufacturer of evil or monopoly.

"Every prospector or operator puts up a temporary plant and tries to make the mine pay its way to proved value or to determine the more efficient equipment. No prospector or operator can secure adequate capital for final equipment on reasonable terms until this is done. If the prospector or operator is forced to seek the whole of his ultimate capital requirements before this proof, it either kills his enterprise or hands him over to the promoter.

"Anyone familiar with the growth of the West knows the mining industry has created and expanded from plowing in its own profits. Nor can it be done any other way. But the new law steps in and says that if you use your profits to prove and build up this business you must pay the Government up to over 40 percent on these profits. That is a tax of up to over 40 percent upon improvements which give men jobs.

"Furthermore metal mining in the early stages happens to be the most speculative of all business. On balance, more money goes into this stage of the industry than ever comes out.

"If the Government is going to take up to 40 percent of the temporary profits from each ultimate failure, as well as the successes, the miner does not stand a dog's chance.

"Somewhat the same situation applies to large low grade deposits. Many of them which have been made successful industries by plowing in the profits of the first unit would never have started had they tried to find all the capital at once.

"Here again this tax up to 40 percent on profits becomes a tax on improvements that would give men jobs.

"This taxation favors the big mining corporations. These concerns already have capital reserves; they can secure capital on easy terms. They can take up a dozen prospects and write off the losses against profitable ones.

* * * I sometimes wonder if it ever occurred to anybody that one of the important things that makes jobs and increases national assets is expansion or improvement in plant or production. That should surely be our social and economic purpose. In that light it might be a sane thing for the Government to reverse itself and say four things to the people.

"First, that if you will expand or improve your equipment and production we will give you a reasonable exemption from corporation taxes on all the

profits you expend that way. And I mean every form of corporation taxes including the so-called normal tax on profits. But this exemption should be limited to the amount of profits plowed in for the purpose.

"As a matter of fact, it would make more jobs than all the boondoggling of the nation—and they would be honest jobs. And it would increase the national assets and not deplete them.

"There is another factor here beyond the desirability of encouraging new enterprise and expansion. Our tax-laws in reality allow nothing for obsolescence. I am aware of the allowances for depreciation but that does not cover obsolescence. Depreciation implies wearing machinery out. Obsolescence means the good machinery that needs to be thrown away to allow the installation of new inventions. Obsolescence has become a far greater element in industrial management during recent years, for invention proceeds at a tremendous pace. Machinery and equipment are today seldom worn out. They are discarded for something better. It is in the national interest that this should be done since industry is not serving the public unless it is up to date. It is only thereby that we lower costs of production and prices, and thus improve the standard of living. Therefore freedom from corporation taxes on profits set aside for these purposes would be just common sense.

"Second, it has been already pointed out that there are times when every business will lose money. It is at just such times that they cannot secure capital. If they have cash reserves they can hold staff and workmen together until things improve. The copper mines of the west would have all closed down if they had not had reserves. In fact, the industries of the United States spent billions of their reserves doing that very thing in this depression. If they have been forced to pay out all their profits in dividends to stockholders in good times, bad times will mean vastly increased bankruptcy and many more workers on relief.

"Would it not seem common sense to allow some further ratio of profits to be accumulated in every business against such contingencies? That is the greatest employment insurance that can be built up. And it is built up not at the cost of taxpayers but at the cost of stockholders.

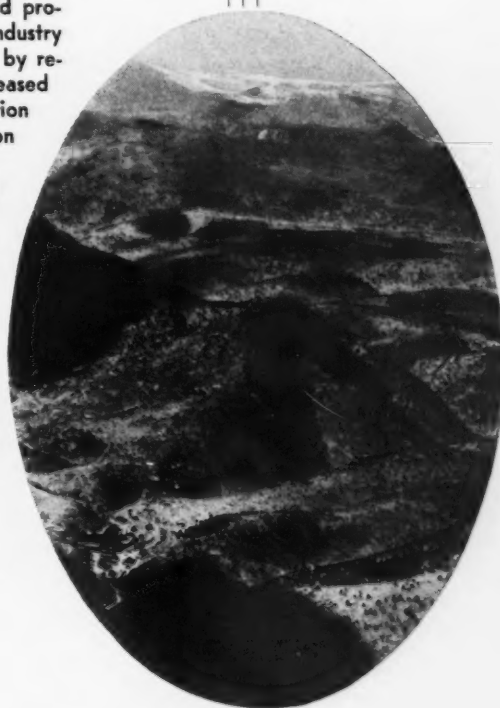
"Third, there is another complexion of all this. Our industry tends to become inflexible and static. There are forces in it which work far more powerfully in that direction than do monopolies upon which it is usually blamed. We do not get the decrease in price levels that increasing efficiency should produce. If we are going to stifle the opportunity of new men to go into industry or of industry to expand, then competition is still further stifled. But by reversing this and applying such pressures for competition as increased improvements and expansion of plant, we can produce more competition and lowering of prices in a day than all the anti-monopoly legislation will produce in a year.

"Fourth, one effect of the new law will be the expansion of bonded debt of corporations who are forced to pay dividends on one hand and borrow money for improvements on the other. That is the advantageous thing to do under this new law but that increases overhead and renders such business less able to meet shocks.

"Finally, after reasonable exemptions from all corporate taxes are given for these items—profits plowed into expansion and improvements, profits set aside against rainy days, profits set aside for depreciation, depletion and obsolescence—then if the corporation did not pay out the balance in dividends, it could well be construed as trying to avoid taxation. And I have no sympathy whatever with any such action. * * *

—Hon. Herbert Hoover,
Before Annual Meeting, Western Division, A. M. C.

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Jesse F. McDonald
Chairman, Board of Governors,
Western Division

guests at the head table: Mr. Howard I. Young, President of the American Mining Congress and president of the American Zinc, Lead & Smelting Company; Mr. Stanly A. Easton, chairman of the program committee and president of the Bunker Hill and Sullivan Mining and Concentrating Company; D. D. Moffat, vice president of the American Mining Congress and vice president of the Utah Copper Company; D. A. Callahan, vice president of the American Mining Congress and former state senator from Idaho; Eugene McAuliffe, director of the American Mining Congress and president of the Union Pacific Coal Company; Carl R. Gray, president of the Union Pacific Railroad Company; Arthur Roeder, president of the Colorado Fuel & Iron Corporation; Robert Searls, Newmont Mining Company; Robert M. Linton, southern California mine operator; Jesse F. McDonald, retiring chairman of the board of governors of the Western Division; Oscar N. Friendly, newly elected chairman of the Western Division and vice president of the Park Utah Consolidated Mines Company; R. C. Allen, vice president, Oglebay, Norton & Co.; A. E. Bendelari, director of the American Mining Congress and president of The Eagle-Picher Lead Company; Judge James Owen, chairman of the local committee on arrangements and president of the Cripple Creek Mill Co.; Charles H. Segerstrom, director of the American Mining Congress and president of the Carson Hill Gold Mining Corporation; the Honorable William H. King, United States senator from Utah; Roy Miller, Texas Gulf Sulphur Company; Honorable Hubert S. Work, former secretary of the Interior; John W. Finch, director of the United States Bureau of Mines; and Julian D. Conover, secretary of the American Mining Congress.

On Tuesday, September 29, the annual

A DECLARATION

Taxation and Finance

- We endorse and reiterate the declaration of principles of the American Mining Congress of January 15, 1936, as follows:

"Deal fairly with the taxpayer in the enactment and administration of tax laws.

"Remove from tax laws all provisions which repress and retard business enterprise, employment of workers and economic recovery.

"Amend the Federal tax laws to reestablish the flat rate of corporation tax, to restore the right to make consolidated returns, to remove the tax on dividends received by corporations, to permit business losses of one year to be deducted from future income, to provide full allowance of capital losses, and to permit annual declaration of value for capital stock taxes, particularly in case of mining properties in the development stage."

We condemn the principle of a penalty tax on undistributed earnings of corporations, embraced in the 1936 Revenue Act. This tax gives no consideration to the reasonable needs of the business. It retards the development of worth-while mining properties, cripples mining corporations which have incurred indebtedness for properties or improvements, prevents the expansion of facilities for treatment and utilization of the products of mines, and penalizes the accumulation of reserves needed to maintain pay rolls and carry on the necessary operations of mining properties during periods of low earnings over which the industry has no control. It actually consumes capital that should properly and beneficially be expended for the legitimate purposes of the mining industry.

We urge prompt reduction of government expenditures and balancing of the budget. Congressional control over expenditures must be reestablished.

The proper function of the taxing power is solely to raise revenue for the necessary expense of government, and not as a means for redistribution of wealth.

No manipulation of money or figures and no use of hidden or indirect taxes can change the fact that everybody pays taxes and that the people as a whole must produce and furnish to the government all that it spends. Continuation of the present rate of spending must inevitably bring about a broadening of the base for personal income and other direct taxation.

Extension of Federal Government

- We deplore the tendency to center supervision of business in the Federal Government.

We disapprove the policy of controlling state action through the medium of national legislation.

We oppose the growth of bureaucracy, and urge a return to government by law instead of by executive order or administrative decree.

Government in Business

- We urge that the Government retire from business in competition with its citizens. We oppose all government interference in the conduct of business, except insofar as may be necessary to protect the rights of all citizens.

Reciprocal Trade Agreements

- Changes in tariff rates should not be made through trade agreements with foreign countries without specific approval of such changes by Congress after public hearing.

*The Western Division of the American Mining Congress, in annual convention at Denver, Colorado, October 1, 1936, declares its views upon subjects of public policy.

OF POLICY*

Currency

● We favor the return of the control of our monetary system to the Congress. We favor a currency system with a metallic base as opposed to a so-called managed currency. We favor the use of both historic metals—gold and silver—in such currency system, and we favor the continuation of purchases of newly mined domestic gold and silver as a means of providing and maintaining a metallic base for our currency.

Labor

● The essential interest of employe and employer is to obtain efficient production through the cooperative efforts of labor, management and capital. Avoid government interference with such cooperation.

Let employers and organizations of employes be subject alike to legal responsibility for their conduct and that of their agents.

Secure to employes freedom from coercion from all sources.

The establishment of wage levels by legislation or fiat of governmental authority is contrary to sound economic principle. Wages ultimately are paid from income; income results only from production and is not created by law.

The mining industry as a whole recognizes its responsibility to its employes and to the communities where it operates, and has met that responsibility by maintaining extensive employment all during the depression. It has established its operations on the basis of fair and reasonable daily and weekly working hours, which compare most favorably with those in other industries, and which have permitted maximum efficiency, safety and satisfaction to all concerned. We oppose any proposals to further restrict working time by legislative action.

We believe in the best possible working conditions for the employes in the mining industry and approve all reasonable and proper measures for promoting their health and safety.

Relief

● We urge that direct relief at reasonable subsistence rates be substituted for work relief; that Federal administration of relief be discontinued at the earliest possible date, and that all relief administration be returned to local agencies.

Economic Stability

● Confidence is the foundation of economic recovery and stability. Essential to the restoration of confidence are balanced budgets; stable money; thoughtful, well considered legislation confined to sound general principles; impartial administration of the law, and encouragement of private enterprise and initiative.

United Action

● The ever-increasing complexity of relations between government and the mining industry requires that the members of this industry, insofar as possible, be united for the protection and promotion of their common interests before legislative and administrative agencies of government.

It is the considered opinion of this convention that such common interests can be most effectively served, and facts and arguments presented at hearings before congressional committees and Federal agencies at Washington, D. C., through the American Mining Congress.

We recommend that in each of the mining states there should be a central association of all mineral and metal producers of that state, charged with the proper representation and protection of their common interests before the legislative and administrative department of the state, and that there should be the fullest cooperation between all such state organizations and the American Mining Congress.



Julian D. Conover
Secretary, The American Mining
Congress

meeting of the board of governors of the Western Division was held at a luncheon of the board. Oscar N. Friendly, vice president and general manager of the Park Utah Consolidated Mines Company, Salt Lake City, was unanimously elected as chairman of the board of governors of the division for the year 1937, and Salt Lake City was selected as the meeting place for the convention and exposition. The membership of the board of governors appears on page 37.

President Howard I. Young, of the American Mining Congress, and Mrs. Young attended the entire convention. On Thursday, October 1, Mr. Young presided at a luncheon meeting of the national Board of Directors of the American Mining Congress, at which there was a general discussion of important problems that confront the mining industries today.

One of the important features of the entertainment was a drilling contest staged at the civic center on Tuesday afternoon, September 29, at 4 o'clock. This was an old time miners' hand drilling contest with prizes aggregating a thousand dollars. Winners of the contest are as follows: Double hand contest— $\frac{1}{2}$ " steel, with 8 pound hammers or less—first prize Mickie and George Coughlin, Boulder, Colo., 24 1/16", \$350; second prize, A. F. and E. J. Eecker, Black Hawk, Colo., 21 7/8", \$200; third prize, Peterson & Riley, Sugar Loaf, Colo., 20 3/4", \$100. Single hand contest— $\frac{3}{4}$ " steel with 4-pound hammers—first prize, Fred Dopp, Jamestown, Colo., 12 1/2", \$200; second prize, A. F. Eecker, Black Hawk, Colo., 11 3/16", \$100; third prize, Arch Walker, Boulder, Colo., 11 1/8", \$50.

In conjunction with the convention was staged the national exposition of metal mining equipment, which was partici-



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"The claim in the Federal Budget for 1937 that relief expenditures have been greatly reduced is false and that the expenditures for that purpose only appear to be less because of 'shocking sleight-of-hand' bookkeeping methods.

"The cost of running the ordinary departments of government has been increased by \$2,500,000,000 a year since 1934 in spite of the impression that has been given out that the ordinary government budget has been balanced and that only the extraordinary expenditures due to relief do not balance with income.

"The Government, in all probability, now is near the limit of its borrowing power, with its outstanding debt of \$35,000,000,000.

"The budget could be balanced without reducing relief expenditures if ordinary government expenditures were cut down to what they were in 1934.

"The 1937 budget calls for expenditures of \$8,500,000,000 and foresees only \$5,500,000,000 in receipts. Some of those receipts are problematical. The largest annual income the Government ever received was in 1918 and 1919 when the revenues were slightly more than \$6,000,000,000.

"The Government must get revenue from one of three sources—taxation, confiscation, or repudiation. You will have to decide some day which method you will use to defray these expenditures. We must all admit that in the past we have used all three. There are certain natural limits, however. Confiscation cannot be used recurrently. Once property has been confiscated, it cannot be confiscated again. Repudiation can be recurrent provided it is not used frequently. There is a maximum to the amount that can be raised by taxation."

—Ellsworth C. Alvord, Counsel, American Mining Congress
Washington, D. C.

Before Annual Meeting, Western Division, A. M. C.



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"You are interested in reciprocal trade agreements because of the effect they can have on the volume and sales price of the minerals you produce.

* * * The United States is still the world's greatest market place. It still offers the greatest market to foreign producers. In 1921 our imports were \$2,500,000,000; in 1923, \$3,792,000,000. In 1925 our imports rose about \$4,000,000,000, and in 1926 were almost \$4,500,000,000. They continued about \$4,000,000,000 through 1929, when they were almost \$4,400,000,000.

* * *

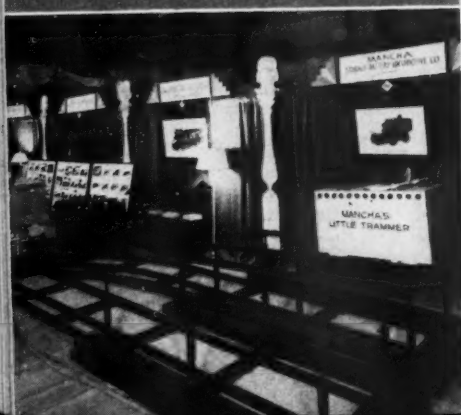
"Until very recently, it was the accepted theory that foreign nations could only buy from us if we loaned them enough money. The billions of dollars that we lost in private foreign loans in addition to foreign governmental loans as a result of this policy shows its error.

"In 1929 the total volume of all business within the United States was \$52,000,000,000. Of this, \$5,000,000,000 were our exports. In 1933 the total volume of business dropped to \$25,000,000,000, of which \$1,600,000,000 were exports. The money volume of business dropped one-half and the physical volume of business dropped one-third. Whether estimated by dollars or by volume, our trade recovery certainly depends more on getting back the lost \$27,000,000,000 of internal business than it does in getting back the lost \$4,000,000,000 of export business.

"Will we need to have a costly lesson in relation to reduction of duties under reciprocal trade agreements to prove to us that as 90 percent of our total volume of commerce lies within the United States, it is foolish to jeopardize it to increase by a fraction of a percentage the 10 percent which lies abroad?"

—Herbert Wilson Smith, Union Carbide & Carbon Corp.

Before Annual Meeting, Western Division, A. M. C.



pated in by 74 manufacturers of mining machinery and supplies. L. W. Shugg, through the courtesy of General Electric Company, served as honorary director of exhibits. This is the third exposition held in conjunction with this convention and its steady growth indicates its importance. The first exposition was held in San Francisco in 1934 with 66 manufacturing companies and mineral states participating; the second was held in Chicago in 1935 with 68 companies and states participating. This year marked a vastly greater interest by both exhibitors in their booths and operators in the exhibit. More operators found time in which to inspect the equipment presented and the companies

participating in the exhibit were at special pains to present their product effectively. Among the outstanding exhibits were those of the Sullivan Machinery Company of Chicago; the Timken Roller Bearing Company, Canton, Ohio; the United States Steel Corporation of Pittsburgh; the Ingersoll-Rand Company of New York; the Gardner-Denver Company of Quincy, Ill.; the duPont Company of Wilmington, Del., and the Mine Safety Appliances Company of Pittsburgh. More and more heavy equipment is being presented at this exposition and it is anticipated that at the 1937 exposition, where it will be possible to present all types of equipment due to the high permissible floor load of

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**BOARD OF GOVERNORS
WESTERN DIVISION
THE AMERICAN MINING CONGRESS
1936-1937**

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TEXAS—

Brent N. Rickard, Mgr., El Paso Smelting Works, American Smelting & Refining Co., El Paso.
H. F. Treichler, Gen. Mgr., Texas Gulf Sulphur Co., Newgulf.

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W. Mont Ferry, Vice Pres., Silver King Coalition Mines Co., Salt Lake City.
Ex-Office: A. G. Mackenzie, Secy., Utah Chapter, A. M. C., Salt Lake City.

WASHINGTON—

Lewis P. Larsen, Pres., Pend Oreille Mines and Metals Co., Old Natl. Bank Bldg., Spokane.
Dean Milnor Roberts, Professor, Mining and Metallurgy, University of Washington, Seattle.



the exposition building, many exhibitors will present their machinery in actual operation.

A feature of these expositions has been the Mineral States exhibit which has been participated in by a large number of metal mining states. This year 10 states participated, showing charts to indicate the importance of minerals to the economic welfare of the state, statistical information as to wages, taxes, etc., and in many instances splendid specimens of the ore produced within the state. Notable among these were the gold exhibits of California and Montana and the mineral exhibits of Utah, Arizona, Idaho, Alabama, Tennessee and Illinois. These Mineral States exhibits have demonstrated how little common knowledge there is even among mining men themselves as to the great part minerals play



in our industrial prosperity. Dr. M. M. Leighton, of Illinois, who was chairman of the Mineral States committee this year and who presented such an excellent display of Illinois' mineral resources, is taking a most active interest in organizing the state geologists and the mining men of the various mineral producing states into a group where information of this character may be available to mining men and the general public.

While the convention officially closed on Thursday evening, October 1, Friday, Saturday and Sunday following were devoted to excursions to various mining districts which proved to be as intensely interesting as the convention itself. The first of these trips was on Friday to the Pueblo plant of the Colorado Fuel and Iron Corporation, where the delegates were guests of Arthur Roeder, president of that company. A special train conveyed the delegates to the plant and every effort was made to give them an opportunity to see all points of interest. Luncheon and dinner were served to the delegates and a most instructive and delightful trip was arranged. On Saturday, the delegates were guests of the Climax Molybdenum Corporation at Climax, Colo., where they inspected the ex-



tensive surface workings of this interesting property, which has in the process of completion a three million dollar expansion program. Molybdenum, one of the newer minerals, is rapidly taking a most important place in ferrous metallurgy and the Climax mine, the world's principal source of supply, is one of Colorado's most outstanding mineral properties. W. J. Coulter, general manager, acted as official host for the company. On Sunday, October 4, L. G. Carlton, president of the Golden Cycle Corporation, was host to a trip to the Cripple Creek district. Delegates were taken to Colorado Springs by auto-



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"Whatever we may think of this legislation (1936 tax law), we must recognize that it exists and that it imposes a tax burden the like of which we have never had before. I think the undistributed profits tax as now imposed is poorly conceived, ill-considered legislation, unfair to many taxpayers, difficult of interpretation and administration, bad in its economic effect on business and for that reason hurtful to government revenues. It will often require the heaviest tax to be paid by those least able to pay the tax. It will discourage new business and new enterprise when we ought to be encouraging them. It weighs heavily on new business which is trying to get a foot-hold or the business that is struggling to recover from prior losses. It may act definitely as a penalty on the employer who increases his payroll and his inventories. In some cases it may even form an inducement to decrease payrolls and inventories.

"I am not saying the Administration intended this legislation to have these effects. I think it little realized what it was doing and failed to recognize the importance of these objections to the tax when they were laid before it. The practical question before us is not the motives which impelled the passage of this legislation. It is the question of the actual effect which it will have. The more we may recognize that it may have effects which its authors never intended it to have, the more serious consideration must we give to this legislation as it affects our own business affairs. I therefore urge that you do take it seriously and that you do each consider it as it will apply to your own business affairs. You cannot dismiss it lightly with the thought that neither Congress nor the Administration possibly intended this law to have as unfair and unreasonable applications as you may see that in some cases it will have. Furthermore, as I shall show, you cannot wait until after the close of the year to see what its effect has been for it may then be too late to take measures which otherwise might have been taken to minimize the severity of the tax burden imposed by this law."

—Henry B. Fernald, Chairman, Executive Tax Committee, A. M. C.
Before Annual Meeting, Western Division, A. M. C.

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mobile and transferred to a special train as guests of Mr. Carlton. They visited the Ajax Mining Company where they were taken underground. Altogether these trips so generously provided by Colorado mining operators proved to be most instructive and delightful features of the meeting and all of those who were so fortunate as to attend were delighted with the result.

Last but not least were the special features arranged for the ladies' entertainment and which
(Continued on page 40)

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"In approaching the questions involved in the financing of our mining industry we must recognize at the outset that we are dealing with matters of great national significance. The problems of an industry such as this, which produced \$1,250,000,000 worth of raw materials in 1935, and which ranks with agriculture as a basic industry, are truly national problems that deserve careful and sympathetic study. Furthermore, mining finance, especially in the precious and semi-precious field, possesses characteristics different from those commonly present in ordinary industrial financing. Where, in the average manufacturing industry, the problem of successfully distributing the product is integral to the problem of manufacture, in precious metal mining it plays a much lesser part. Instead, in precious metal mining, the discovery and development of a source of supply becomes paramount. * * *

"Of prime importance to investment in mining enterprises seems to be the following factors: the property, the management, the development program, including the uses to which funds will be put, the promotional features of the deal, and the costs of distribution and underwriting. * * *

"In dealing with the question of

the property, the attempt has been made to differentiate those mining properties where sufficient work has been done to disclose tonnages of proven or probable ore from those properties that are still relatively undeveloped. It is recognized that in properties of the first group it is possible and desirable to present the facts concerning the presence of such ore in the form of an assay map. It is also possible, where such ore has been exposed, to make an estimate of operating costs, based on available information—and no more than an estimate is asked for.

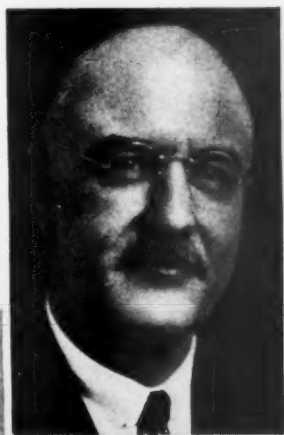
"But where definite tonnages of proven or probable ore are not claimed—that is, where the property is still undeveloped—neither an assay map nor a cost estimate is asked for. Indeed, under these circumstances it might be misleading. Instead, only such customary surface and underground maps showing what development work and sampling have been done need be supplied. Generous latitude is afforded a registrant of a partially opened up property to present all facts justifying his opinion for the expenditure of funds in development. This should give ample opportunity for the raising of capital to open up resources which have not been exposed, and the certainty of which can be determined only by development.

"The underlying thought back of

the property questions is to eliminate statements regarding tonnages, assay values, and costs that have little if any factual basis. The registrant can tell all the facts regarding these vital points. But when definite claims are made of concrete figures of tonnage, values or costs, they must be supported by facts. On the other hand, it is recognized that funds may be legitimately sought for purely prospective undertakings, but in that event numerical estimates, which obviously cannot be supported by facts, should not be claimed. * * *

"The engineering exhibits that we would require are called for primarily in the case of the semi-developed and developed properties. No hardship should be involved in furnishing them, for the well-run mine possesses them already. Except under unusual circumstances, the inability to furnish such exhibits is in itself a reflection upon the management of the enterprise. As such it is a warning to an investing public that management, even though perfectly honest, is not doing an efficient job. Thus, it may well prophesy loss in what would otherwise be a sound investment."

—James M. Landis, Chairman,
Securities and Exchange
Commission
Before Annual Meeting Western
Division, A. M. C.



Left—Oscar N. Friendly, newly elected chairman, Board of Governors, Western Division.

Right—A. G. Mackenzie, secretary, Utah Chapter, American Mining Congress.

Below—Salt Lake City, which has been chosen as site for the 1937 convention and exposition of the Western Division.





Robert S. Palmer
Secretary, Colorado Chapter, The American Mining Congress, who has taken an active part in the development of the convention

(Continued from page 38)

set a new record for these conventions. Mrs. Helen Campion Mulvihill served as chairman of the ladies' section, but because of illness was unable to participate in many of the activities. Mrs. Verner Z. Reed, distinguished mining woman of Colorado, opened her home to the visiting delegates and their wives and otherwise assisted in the general arrangements. Mrs. Jesse F. McDonald, wife of the former governor of the state and official hostess for the convention, entertained with charm and distinction. The ladies attended the luncheon to Mr. Callbreath on Monday noon, following which an automobile trip had been arranged, but due to the fact that Denver was covered with two feet of snow on the opening day of the meeting this was abandoned, and Mrs. Mulvihill entertained them at tea at her home. The weather disrupted the schedule for the ladies and the Tuesday trip to Colorado Springs as the guests of Mrs. L. G. Carlton was regretfully abandoned. However, the ladies were entertained at luncheon at the Denver Country Club on that date; on Wednesday they were taken through the Denver Rocky Mountain parks, honored by a special police escort, and on Thursday were special guests at a delightful luncheon sponsored by the ladies' auxiliary of the Colorado section of the American Institute of Mining and Metallurgical Engineers at the Cherry Hills Club, followed by a musical program and later, a cocktail party at the home of Mrs. Verner Z. Reed.

All delegates attended the Monday evening dinner at the Cosmopolitan Hotel where an unusual entertainment was

"* * * But to confine ourselves for the moment to the question of employment and industrial efficiency, we find that from 1870 to 1930 the population of the United States increased by 218 percent and the number of those gainfully employed increased 291 percent. While the part of the population gainfully employed increased from 32.4 percent to 39.8 percent, the number of children between 5 and 15 years of age gainfully employed or not at school decreased from 10.7 percent to 2.9 percent of the total population and those attending school increased from 16.6 percent to 22.7 percent of the total.

"Considering production as a whole, in 1930 some 398 workers per 1,000 inhabitants found employment producing the goods and services demanded by the consumers of this country as compared with only 324 per 1,000 immediately after the Civil War. This expanded employment, plus the new machinery, the new technique and higher efficiency, has increased prodigiously the volume and variety of the commodities and services available for the comfort, convenience and luxury of the American people. If we set at 100 the 1870 indices of total population, number gainfully employed and the volume of trade, the corresponding values of those three items in 1930 were 318 and 378 and 1,579, respectively. And by virtue of higher efficiency this increase in productivity was accompanied by a substantial decrease in the working time of those gainfully employed.

"It is obvious that your industry will continue, as in the past, to be dependent in a high degree upon rail transportation. I can say confidently that the railroads have not and will not disappoint you. I can say with equal confidence that the old days of car shortage and congestion are gone forever. The railroads are carrying on research in its best sense, and to a degree not commonly understood, although you are all more or less familiar with the development of lighter weight freight and passenger equipment through use of higher tensile strength metals, and the search for more efficient motive power as illustrated by the Diesel-electric and now the steam turbine-electric units. To this is added the constant re-

"* * * A comparison of relative employment shows that from 1870 to 1930 manufacturing employes increased from 21.2 percent to 28.9 percent of the total, while agricultural decreased from 53.4 percent to 21.4 percent. But the number employed in distribution and services increased during the same period from 23.5 percent to 47.2 percent of the total. Be it noted that this increase in the proportion of those employed in manufacturing, despite the vast use of modern technique and machinery, results from the second type of new employment, i.e., the wholly new industries developed by technical progress to provide the new goods and services required to gratify the desires of a people whose purchasing power has been increased by other technical progress.

"* * * Here is one of the major problems that confront all productive American industry; it will be solved only as we approach it with a view to placing men in the newly-created jobs. It cannot be solved either by restraining our technical productivity or by accepting the defeatist fallacy that chronic unemployment is inevitable and that we must look forward to carrying an increasing number of idle by taxation of the producers."

—Willard Chevalier, Vice
Pres., McGraw-Hill
Publishing Co.

Before Annual Meeting,
Western Division, A. M. C.

search of all those industries which manufacture materials used in railroad construction and equipment.

"Throughout the depression railroad service has constantly improved. * * * The day of pioneering has not passed—it is ever with us in new and interesting forms. The experience of the last few years, bitter though it has been, has taught us lessons of great value in an economic sense, thereby strengthening the ability to meet and to surmount the difficulties which still lie ahead."

—Carl R. Gray, Pres.
Union Pacific R. R. Co.

Before Annual Meeting,
Western Division, A. M. C.

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"The enactment of state unemployment compensation laws means more than benefits to the unemployed workers immediately concerned. It means benefits to the state, to industry, to labor, and to the community at large.

"Regardless of whether or not we had a social security act, it would have been necessary to find shelter and food for the unemployed and to maintain persons who become dependent in their old age. Worker obsolescence, in my opinion, is a perfectly just charge against the cost of production of the goods into which the worker puts something of himself and in the making of which he wears himself out.

"Under the provisions for unemployment compensation, the cost of unemployment is charged back to the industry. The precedent for this is found in the long established practice of accident compensation. The social security act does not establish a system of unemployment compensation, but rather it defines such a system. Until states pass their own legislation there will be no public unemployment compensation within their political borders."

—Vincent M. Miles, member,
Social Security Board
Before Annual Meeting, Western Division, A. M. C.

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presented, with the Ranger Revue, a coast-to-coast radio attraction, and a lovely ballet and other numbers by the Cushing Dancers of Denver; the informal dinner at the Denver Country Club on Tuesday, and the annual dinner on Wednesday, which featured the Honorable Herbert Hoover as guest speaker and John T. Barnett as toastmaster, followed by special concert features and dancing by the ballet. All delegates also attended the decidedly western and equally delightful barbecue at the El Jebel Temple on Thursday evening. The entertainment for that evening included the Cheyenne Mountain Dancers, the Cowboy Quartet and old-fashioned round and square dances. The committee on entertainment, which included the following members, deserves the hearty commendation of all of the delegates for the unusual and excellent type of entertainment that was presented: C. O. Withrow, chairman, Denver; J. G. Clark, chairman, Boulder; W. H. Bachman, H. C. Bretschneider, Thomas A. Dickson, G. W. Gunderson, V. C. Herin, Alfred A. Holland, O. H. Johnson, Harry D. MacDonald, W. E. Scott, Jr., R. H. Summer, Walter G. Tripp, J. Q. Trompen, Troy E. Wade, and E. R. Wilfley.



Views of Mineral States Exhibits which were an outstanding feature of the Convention

Mechanization Trends

Reports of Coal Operators Committees

Mining Systems With Mechanical Loading

THE design of a mining system—that is, the arrangement of the working places, their widths, lengths, and order of working—for mechanical loading with mobile machines has to satisfy a number of requirements that are quite different from those in hand loading. Because of the fact that both types of operations use the room and pillar system, their mining plans are fundamentally similar and a casual examination of the mine maps for mechanical loading does not, in most cases, reveal any differences from the plans used for hand loading. However, the differences are there, as anyone can testify who is successfully operating loading machines on a large scale.

In hand loading there is a certain amount of flexibility. Men can be shifted about, not only from one place or section of the mine to another but also from one job to another. The num-

ber of miners reporting for work in one particular section is apt to vary from day to day, so that all places do not advance at the same rate, but hand loaders can be crowded together or spread apart when there is need for speeding or retarding some portion of the panel.

With mechanical loading an entirely different situation exists, and the requirements are more rigid. In the first place, a machine must be assigned to a certain definite territory and should not be shifted about. The working places in this territory must all advance at the same rate—one or two rooms cannot be allowed to get behind and become isolated. If the workings are not concentrated, then the time lost in tramming the equipment from one place to another is excessive, and with mechanical loading any appreciable amount of time lost during a shift cannot be regained. Consequently the mining system must be so

arranged that delays, which would be unimportant in hand loading, will not occur.

We have long recognized that coal mining is largely a problem of transportation, and with mechanical loading this problem is complicated by the fact that rapid movement of equipment, particularly the loading machines, is just as essential as the transportation of coal. The point to keep in mind is that the machine is actually idle when tramming, even though its crew may be working hard and efficiently. So the mining plan should be designed to do two things—provide for rapid movement of equipment, and reduce the amount of movement to a minimum. Concentrated workings with connecting tracks close to the faces will shorten the tramming distance; good track with easy curves will increase the tramming speed, and widening the rooms to give greater production from each place will lessen the number of moves necessary to get the daily tonnage.

The two reports prepared by the District Committee of Utah are submitted here to show how the factors discussed above have been taken care of at these two operations.

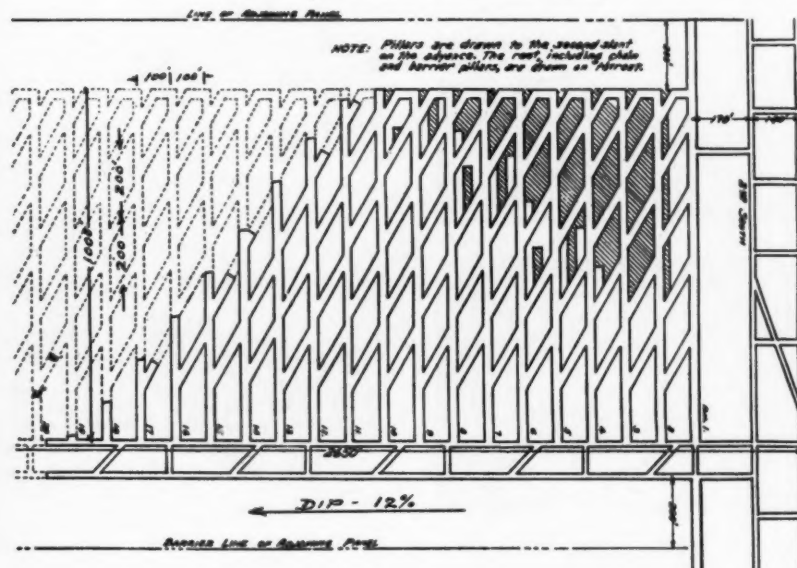
Alvin B. Southern

Report by the District Committee of Utah

General Conditions

The mine is a drift operation. The coal is approximately 12 ft. thick, the top varies from shale to a sandstone and the cover is approximately 1,200 ft. The seam pitches an average of 12 percent and the main motor road (see attached sketch) is driven along the strike.

Utah Mining System in Pitching Seam



Mobile loading machines are used in the rooms (which are driven on the strike) and in the slants. The coal in the rooms and slants is undercut with track mounted machines, and is electric drilled. Six ton trolley and reel locomotives serve the mechanical loader using three-ton steel mine cars. Rope haulage is used on the room entry which is driven on the pitch of the seam.

Mining System

The attached sketch shows a panel developed to full production with entry advancement, room driving, and pillar recovery all going on. To reach this stage requires approximately 1½ years. The period of maximum production is maintained about 3½ years, and then the tonnage declines for 3 years until extraction is complete. The full life of the panel is about 8 years. The estimated shift tonnage during each of the above periods for a panel is as follows:

Period of development, 400 tons per shift.

Period of maximum production, 800 tons per shift.

Period of declining production, 300 tons per shift.

The total tonnage produced from a panel is divided as follows:

Entry driving, 2.64 percent.

Room and slant driving, 31.43 percent.

Pillar recovery, 65.93 percent.

During the development period the number of working places in a panel is determined by the slope rope capacity; after the pillar work has started the number of places is determined by the number of men that can safely be handled on the pillar line. The width of the working places (25 ft.) is determined by the reach of the mining machines but this width is also as great as the top would safely stand. The rooms and slants each produce approximately 95 tons of coal per cut.

Changes in Mining System

With hand loading, the rooms were driven 18 ft. wide on 75 ft. centers. With the installation of mechanical loaders, room widths were increased to 25 ft. and room centers to 100 ft. and the slants were driven 30 degrees off the room instead of at right angles. The installation of gathering motors increased the length of the rooms from 500 to 1,000 ft. Low built trucks have been installed on which the tractor type loading machines are loaded and moved with the locomotives. Partings are built only in every other room, the track going up through the first slant to the room above. The length and spacing of room slants provides two loading places in each room; therefore, when a loader goes into a room it has four places to clean up before it is handled again with the slope rope.

Submitted by THOMAS C. HARVEY,
District Committee of Utah.

Report by the District Committee of Utah

General Conditions

The coal has a thickness of 20 ft. and is mined through a drift opening. The top is sandstone and shale and the cover is approximately 1,000 ft. thick. The seam pitches about 2 percent.

The coal is loaded with a tractor type mobile mechanical loader; undercut and drilled with electric power. The gathering is by electric locomotive and the mine cars are steel construction of two types—3.5 tons capacity and 5 ton capacity.

Mining System

The attached map shows the mining system used with mechanical loading in the entries, rooms and pillar recovery. Rooms are worked advancing and pillars are mined retreating after all the rooms on the entry have been driven.

The panels are 1,400 ft. wide. Because of the heavy cover, barrier pillars 300 ft. wide are left adjacent to the main haulage entries and a pillar 92 ft. thick between the top of the rooms and the next entry ahead.

The life of the panel is approximately 550 working shifts, divided as follows:
Development period, 100 shifts.
Full production period, 300 shifts.
Decline production period, 150 shifts.

During the full production period 5 working places are maintained—either rooms or pillars. Each cut produces 50 tons so that the average daily production is about 250 tons. The total tonnage mined from a panel is divided as follows:
Entry driving, 7.5 percent.
Room advancement, 40.5 percent.
Pillar recovery, 52 percent.

The number of working places in a panel—5 rooms or pillars—is determined

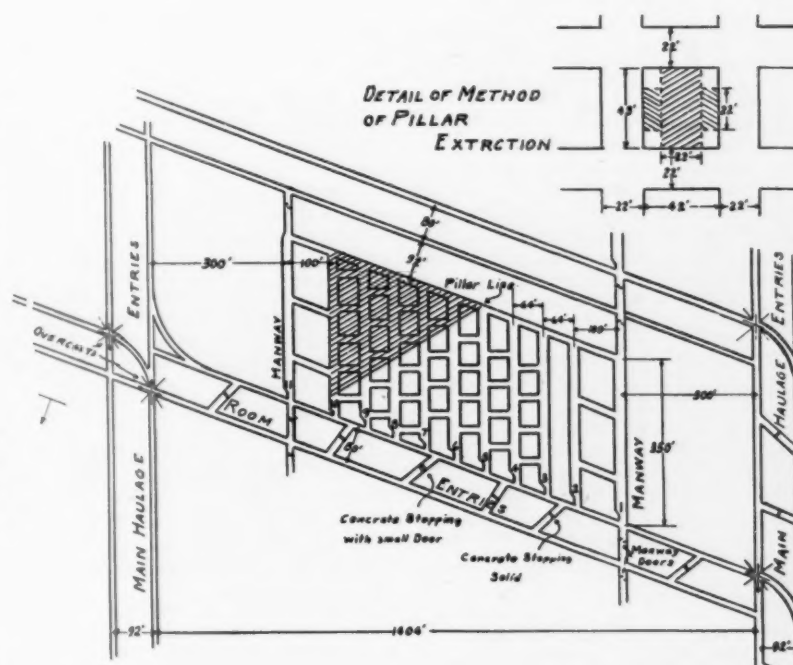
by the amount of coal that can be loaded by one gathering and loading unit in a 7-hour shift. This gives a high degree of concentration. The width of the working places is determined by the nature of the top and also by the reach of the cutting and loading equipment.

Changes in Mining Systems

Two principal changes in the mining system have been brought about through the adoption of mechanical loading. The first was to reduce the room centers from

100 ft. with hand loading to 64 ft. with mechanical loading, as shown on the sketch. This brings about a greater concentration of mining territory. The second change was to turn the rooms off the entries at a slight angle. This provides easier turnout curves and better track which is highly essential with mechanical loading. With hand loading all the rooms and entries were turned at 90 degrees.

Submitted by
The District Committee of Utah.



American Coal Preparation Practice†

By J. B. MORROW*

THE object of this paper is to indicate the trend of coal cleaning in the United States and to describe briefly some of the coal cleaning methods which are not in common use abroad. For that reason, little reference has been made to various types of equipment which are familiar to both continents.

The percentage of bituminous coal cleaned by mechanical means has shown a steady upward trend since 1929. The following tabulation taken from the U. S. Bureau of Mines report, May 11, 1935, shows the tonnage cleaned and the percentage of total output yearly from 1929 to 1934:

BITUMINOUS COAL CLEANED BY VARIOUS METHODS						
	1929	1930	1931	1932	1933	1934
Wet Methods	30,955,141	30,904,510	27,657,735	23,739,279	26,984,372	31,232,000
Pneumatic Methods	5,843,979	7,895,109	8,514,638	6,539,090	7,573,839	8,488,000
Grand Total . . .	36,799,120	38,799,619	36,172,373	30,278,369	34,588,211	39,720,000
Percent of total output	6.9	8.3	9.5	9.9	10.4	11.1

SIZES CLEANED

It is difficult to make any general statement as to the size of coal cleaned. Cleaning of minus 4 in. is quite common and in some cases, particularly in cone installations, coal is being cleaned up to 6 in. In general the increase of mechanical loading in mines encourages the mechanical cleaning of larger sizes in order to reduce the cost of hand picking. The development of mechanical loading will tend to increase the amount of mechanical cleaning and will probably develop some differences in the present design of mechanical cleaning plants.

REFUSE LOSS

The average refuse loss is from 8 percent to 9 percent and will probably increase with the extension of mechanical loading in mines. In this connection there is a wide variation in the efficiency of preparation plants in the United States. Many of the larger units are under close chemical and physical control and are operating with less than 0.5 percent sink at 1.60 Sp. Gr. in the clean coal (4 in. x 48 mesh) and with

a very low loss of coal in the refuse. On the other hand, plants can be found where very little is known about the efficiency of the separation.

Particularly in strip mining operations it is becoming quite common to waste the fine material through dewatering screens as this material is usually high in ash and sulphur. Since the strip pits began to waste, there has been somewhat

of an extension of this practice in the deep mines, but we are doubtful if the advantage to the consumer can offset the coal loss of the producer.

It is noteworthy that captive mines do not waste the fines regardless of any claims of increased efficiency in boiler plants. American coals in general are somewhat more difficult to clean than many of the English coals, but on the other hand, are not any more so than many of the coals on the Continent of Europe.

TYPES OF CLEANING EQUIPMENT

The principal types of equipment used in the United States are described briefly as follows. The capacities given are manufacturers' ratings.

BAUM TYPE JIGS

There are now in operation in the bituminous region 60 Baum type jigs, with a total rated capacity of 7,800 tons per hour. The capacity of each jig varies from 40 to 200 tons per hour, according to the size of the unit. In the anthracite region there are four jigs, with a total rated capacity of 400 tons per hour. Baum type jigs were first intro-

duced in the United States in 1928, although there had been previously two jigs of this type in operation in Nova Scotia since 1914.

RHEOLAVEUR

The first Rheolaveur washer was installed in the Pennsylvania anthracite region in 1923. There are now nine plants operating in the anthracite region with a total capacity of 1,715 tons per hour and 15 in the bituminous region, with a total capacity of 5,520 tons per hour.

MENZIES HYDRO-SEPARATOR

The Hydro-Separator was first installed in the anthracite region in 1924. There have been installed on both anthracite and bituminous coals approximately 520 machines with a total rated capacity of more than 18,000 tons per hour.

The principle of separation is a rising current of water which suspends the coal and causes it to overflow the discharge lip of the cleaning pocket, while the refuse is permitted to sink. The bottom perforated plate through which the water is distributed slopes towards the discharge and delivers refuse to the lower edge where its withdrawal is controlled by a refuse gate.

MENZIES CONE

The Menzies Cone is used principally in the anthracite region where there are now operating 33 cones with a total rated capacity of 2,960 tons per hour. There is one cone in the bituminous region with a capacity of 80 tons per hour.

The principle of separation is a variable velocity of a rising current of water through a stratified mobile mass of coal, bone and slate within the conical shaped separator. The materials are stratified by hydraulic action and by mechanical agitation. The feed is introduced into the center of the cone, the clean coal overflowing into a launder and thence to a dewatering screen and the refuse settling through the middlings bed, drops through the bottom of the cone into a sealed elevator boot.

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† Presented to World Power Conference.

TONNAGE OF COAL CLEANED BY VARIOUS METHODS

The following tabulation, also taken from the U. S. Bureau of Mines' report, May 11, 1935, shows the tonnage of coal cleaned by various methods:

BITUMINOUS COAL MECHANICALLY CLEANED, CLASSIFIED BY TYPE OF CLEANING EQUIPMENT

	Clean Coal, in Net Tons						Pct. cleaned by each classification					
	1929	1930	1931	1932	1933	1934	1929	1930	1931	1932	1933	1934
Wet Methods:												
Jigs	18,914,604	17,723,985	13,957,072	9,963,205	11,895,301	13,769,000	51.4	45.6	38.6	32.8	34.4	34.7
Concentrating tables..	3,532,378	2,272,162	1,550,863	821,291	1,118,900	1,115,000	9.6	5.9	4.3	2.7	3.2	2.8
Jigs in combination with concentrating tables	1,214,265	1,028,366	926,073	805,667	693,295	1,153,000	3.3	2.7	2.6	2.7	2.0	2.9
Launders and upward current classifiers..	7,103,086	9,818,018	11,212,955	12,139,694	13,271,876	15,190,000	19.3	25.3	31.0	40.2	38.5	38.2
Unspecified	190,808	61,979	10,772	9,422	5,000	5,000	0.5	0.2	0.0	0.0	0.0	0.0
Total wet	30,955,141	30,904,510	27,657,735	23,739,279	26,984,372	31,232,000	84.1	79.7	76.5	78.4	78.1	78.6
Pneumatic Methods	5,843,979	7,895,109	8,514,638	6,539,090	7,573,839	8,488,000	15.9	20.3	23.5	21.6	21.9	21.4
GRAND TOTAL ..	36,799,120	38,799,619	36,172,373	30,278,369	34,558,211	39,720,000	100.0	100.0	100.0	100.0	100.0	100.0

CONCENTRATING TABLES

Concentrating tables of various types are common in ore concentration, but have not been in so great a demand in coal washing in recent years due to the fact that many of the newer plants are large tonnage installations and in such cases there are other types of equipment more economical in first cost per ton hour of capacity and at least, equally efficient. The tonnage handled, of course, is one of the most important factors in the selection of various types of coal cleaning equipment. Tables were first introduced in the United States in 1910. Approximately 900 tables have been installed. The capacity of a concentrating table varies from 4 to 12 tons per hour of bituminous coal, depending upon the size and character of coal and on the separating efficiency. For anthracite coal, capacities range from 4 to 20 tons per hour.

In addition to these units there are many older types of jigs still in operation, but we are attempting to confine this paper to newer developments.

PNEUMATIC CLEANING

Pneumatic methods of cleaning coal were first introduced in 1918 and since that time there has been an increasing use of various types of air tables. There are now in the United States approximately 240 tables of the reciprocating type with a rated capacity of approximately 7,500 tons per hour.

STUMP AIR-FLOW CLEANER

The Stump Air-Flow Cleaner was recently developed in the United States. There are now 68 machines in operation with a total capacity of 2,040 tons per hour. This cleaner consists of a pervious deck with a unique combination of perforated plate and resistance material to properly distribute the air to the coal feed along it.

Intermittent air is forced through this deck, pulsed by a rotating valve. The pulsations assist in stratifying the coal and refuse.

At the discharge end of the cleaner is a transverse cutting edge which sep-

arates the various layers into coal, middlings and refuse.

Some provision is usually made to retreat the middlings in a separate machine or return them to the raw feed. The middlings and refuse discharge gates are actuated by lever arms attached to a float. This float, operated by air, is sensitive to variations in air pressure under the deck, consequently the gate openings are automatically adjusted to conform to the amount of refuse within the cleaner so that a uniform refuse may be delivered.

HEAVY DENSITY METHODS OF SEPARATION CHANCE CONES

The first Chance Cone was used in the Pennsylvania anthracite region in 1921. Its capacity was 85 tons per hour. In recent years the number in the anthracite region has grown to 110 with a total capacity of 17,840 tons per hour. During this time nine installations were made in the bituminous coal fields, with a total capacity of 2,530 tons per hour.

The Chance process is a heavy density method of separation and employs for the separation of coal and refuse a flotation medium of sand suspended in water, partly by mechanical agitation and partly by a gently upward flowing current of water. It operates entirely on a specific gravity basis and gives a sharp separation at the specific gravity desired within a range of 1.38 to 1.75. The sizes cleaned range from 6 in. down to ¼ in. The sand consumption when cleaning anthracite coal is 6 pounds per long ton of coal and for bituminous coal is 1¼ pounds per net ton of coal. The circulating water required in gallons per minute per long ton of anthracite coal per hour is 12.5 and for bituminous coal this figure is 17¼ gallons per minute per net ton of coal per hour.

AIR-SAND PROCESS

The Air-Sand separation process is a comparatively new development, using the principle of heavy density separation. Seven plants of this type have been installed in the United States with a total rated capacity of 520 tons per hour

The process is essentially one of flotation in a medium of dry fine sand and air, produced by passing a continuous flow of air bubbles upward through a bed of dry sand in the separation box. The separation box consists of a steel box with a porous plate bottom and a wind box beneath it connected to a blower. The porous plate is a uniformly air-pervious slab of carborundum or other commercial rigid filter plate, which will diffuse a small quantity of air and deliver it above the plate in a continuous flow of tiny bubbles. These bubbles permeate the sand in the box agitating the entire mass to produce a dry quicksand which functions as an homogeneous liquid flotation medium. The medium may be adjusted within certain limits to the specific gravity needed to make a satisfactory product.

The commercial Air-Sand separator box comprises three of these flotation boxes in series, but all built in one integral trough-like unit separated by intermediate dams with overflow rollers to form the three sand pools.

A continual flow of sand carries the products through the machine. The float coal passes over the rollers and discharges from the machine with the sand flowing over the pool roller. The heavy refuse particles, which sink to the floor of the sand trough, are carried along more slowly by the travel of the sand stream until they reach the vertical sand chutes, where they pass out of the machine through these discharge chutes and the slate gates below.

The sand is screened out of both products and returned to the sand storage hopper, making a continuous closed circuit of the sand medium. The sand is continually conditioned by drying and dedusting in the return circuit.

WUENCH DIFFERENTIAL DENSITY CONE

The Wuench differential density cone is an interesting illustration of heavy density separation and is now in use not only on coal but also on zinc ores. Its use on coal includes the use of oil flotation to clean up the medium and filters to dewater the coal recovered by flotation.

The separation is carried out in a medium of intimately mixed clay and water, the clay being obtained from the fine refuse removed from the coal. The specific gravity of the medium at the top of the cone is maintained somewhat under that at the bottom of the cone so that a deep separating zone is obtained in which the danger of entrapped refuse particles is minimized.

The coal overflows to a section of screen, where the medium is largely drained off for return to the top of the cone and then passes to a second section where any adhering medium is washed off by means of sprays. Refuse is discharged from the bottom of the cone either by means of an air lift or inclined sealed conveyor or elevator, to a similar drainage screen, the first section of which removes undiluted medium for return to the bottom of the cone. Medium removed by spraying and cleaned by oil flotation is recovered in a thickener. The clarified water is reused for spraying.

There is one plant of this type in operation on $\frac{3}{4}$ in. by 6 in. coal cleaning 450 tons per hour at slightly less than 1.40 specific gravity. There is also one plant concentrating zinc ore in which the separating gravity is held at 2.80. Here the success of the operation requires a variation in separating gravity of not more than .01.

CALCIUM CHLORIDE PLANTS

There are at present two plants using calcium chloride as a separation medium, but in combination with an upward current. It has been quite common in the United States to spray coal with calcium chloride in order to make it dustless, hence its use as a separation medium, when not used in larger amounts than would be lost in spraying, has some particular advantage in certain parts of the country.

There are now seven plants operating, all in the bituminous region on nut and stove sizes. Their total capacity is 350 tons per hour.

The principle of separation is a combi-

nation of heavy density medium of calcium chloride solution, specific gravity 1.16-1.17, with an upward current motion. The raw coal is fed into the top of a wide, shallow elevator boot and passes over a downward inclined screen through which the solution, flowing upward, being actuated by impellers near the bottom of the boot, floats the coal across the boot, where it is received on an upward inclined screen, from which it is picked up by the elevator flights. Refuse dropped down between the two screens is received by screw conveyor, which discharges into the sealed boot of the refuse elevator. About $6\frac{1}{2}$ gals. of solution are absorbed per ton of coal cleaned. This amounts to about 11 lb. of calcium chloride.

In comparing coal-preparation practice in the United States with that in Europe, it is necessary to consider that the average railroad haul on bituminous coal in the United States is approximately 250 miles, as compared to less than 50 miles in England. This condition has resulted in more attention being paid to mechanical and heat-drying equipment.

HEAT DRYERS

There are now operating 12 Christie rotary kiln dryers with a rated capacity of 590 tons per hour.

Another type of heat dryer which is finding favor is a modification of the Dwight Lloyd sintering machine, known as the D-L-O dryer. In this type, a bed of wet material is moved continuously, rapidly, and evenly on a perforated carrier through a heated chamber. At the same time a volume of heated air is drawn through the bed of wet material by a low vacuum.

Thus, the material is both dried by heat and the moisture is also removed by vacuum. There are at present six D-L-O dryers in operation with a total rated capacity of about 400 tons per hour of coal. They are mostly used on the minus 1-in. sizes.

Just recently the rotary louvre type of dryer has been brought over from

England, the single installation being 10 ft. 3 in. by 30 ft., and drying 40 tons per hour of $\frac{1}{2}$ in. by 0 in. coal. Another is now under construction to handle 50 tons per hour of $\frac{3}{4}$ in. by 0 in. coal.

MECHANICAL DRYERS

On account of the fact that mechanical drying is so much cheaper than heat drying per unit of moisture removed, we have several plants which use both centrifugal and heat dryers. There are now in use in the bituminous coal fields 34 Carpenter centrifugal dryers with a total rated capacity of 1,650 tons per hour, and in the anthracite region one such dryer of 35 tons per hour capacity.

There are over 300 cleaning plants now in operation on bituminous coal in the United States, and of these there are approximately 12 that are mechanically cleaning 400 tons or more per hour. Of the 12 there are 7 Rheolaveur, 2 Chance, and 3 jig-type plants. In the anthracite region there are nine Chance and one Rheolaveur plants cleaning 400 or more tons per hour.

WATER SETTLING EQUIPMENT

One of the principal differences between plants in the United States and those in Europe is in the use of Dorr-type thickeners for water clarification. There are in the anthracite region 30 Dorr-type thickeners with a combined settling area of 115,000 sq. ft., and in the bituminous region there are 30 thickeners of the same type with a combined settling area of 89,000 sq. ft.

The use of thickeners has quite naturally led to the adoption of filters for handling the thickened product. While we see numerous references as to the use of filters, particularly in the English press, we do not read of any large installations. There are nine large filters in the vicinity of Pittsburgh, the sizes of which are as follows: Three at 500 sq. ft., four at 700 sq. ft., and two at 350 sq. ft. These, of course, are all operating on large tonnages, about 80 lb. of dry solids

(Concluded on page 55)





Mill treating 11,000 tons monthly

Arizona Comstock Corporation

THE properties of the Arizona Comstock Corporation comprise the Savage, Hale & Norcross, Chollar, and Potosi mines located on the famous Comstock Lode within the city limits of Virginia City, Nev. The total length of these combined properties along the strike of the famous Comstock Lode is 2,571 ft. These properties were amongst the first that were discovered and operated in the early sixties, since which time there has been continuous work on some of the properties—sometimes only one or two leasers and sometimes a great many men have been employed in the operation of these properties.

The Comstock Lode is a shere zone or fault, having a width in places of over 400 ft., within which distance there are several wide veins of quartz and prophery. It is within these veins that shoots of ore have been found, in the past, that were enormously rich.

In the early days of mining on the Comstock, operating conditions were adverse to cheap mining due to many causes, one of them being the considerable amount of water that was encountered almost from the beginning of operations. This water was found to be very hot, as depth was attained, adding to the cost of mining and also the nature of the ore bodies were such as to make low costs an impossibility because of the formation which did not stand well without enormous timbering. At the same time,

the operators persisted in searching for and finding shoots of high-grade ore that were so high-grade that even the adverse working conditions were met with a noticeable profit to the companies operating here. Under these conditions, however, transportation was lacking except by means of freighting by horses, power generated by steam, fuel was wood and hauled into the camp from the surrounding mountains. The first cost of lumber and timber was cheap, but the transportation handling was excessive on account of the method of transportation then used. The metallurgy used in these early days was not as perfect as it is today, consequently their extraction of the values by any known milling method, at that time, was difficult and gave a very poor extraction of both gold and silver. All of these adverse conditions made it necessary to mine nothing but very high-grade ore, when it is considered that the costs of mining and milling to say nothing of metallurgical loss had a range of between \$25 and \$40 per ton. This range was spread over several years in the early history of the camp and, as a matter of fact, until the high-grade shoots of ore were supposed to have been exhausted no attention was

ever made to milling anything less than the contents of these high-grade shoots of ore. No attention was paid to the immediate surrounding vein matter which contained, and does contain today under present favorable working conditions, highly payable values.

There appears to be, measured by values, three different grades of material contained in the Comstock Lode: First, the high-grade ores that run from \$50 to \$1,000 or more per ton. Secondly, the shoots of ore, sometimes surrounding these high-grade shoots of ore, that contain under present-day conditions highly payable values. Third, is a material that has no value also contained in the Comstock Lode. There appears to be large bodies of the second series with remnants of high-grade shoots that were mined in the early days and the possibility of finding, with present-day mining methods, other high-grade shoots of ore that have never been discovered up to date because there are many sections of this great lode that have never been prospected although the old-timers did much exploration work. Unfortunately the maps and records of these early day workings have nearly all been destroyed or at least have disappeared making it

By W. J. LORING*

* President and Managing Director.

quite impossible to use much of the early history to advantage at this time.

The redeeming feature of this Comstock Lode is the fact that the vein system is of enormous size. It has been followed down by various operations along this lode for a distance of nearly a mile measured along the dip of the vein. The greatest depth attained on the Comstock Lode has shown high-grade ore. This, coupled with the great width of the vein system and the fact that there was a line of demarcation between the end of the period when nothing but high-grade ore could be mined at a profit when all of the mines closed down and no attention was paid to the lower-grade materials for the reason that costs were high and the whole set-up was based upon taking nothing but high-grade ore. Therefore, there was a period between the high-grade period and the present-day period of a considerable length of time.

It must be remembered, in making a statement of this kind and dealing with so important a mining section as this one is that one must, without covering a considerable amount of space, deal generally with the subject because no one is much interested except those engaged in present-day operations in minute details, therefore, I must be permitted to generalize in some cases rather than detail the subject being covered.

A faint attempt has been made, from time to time, to correct metallurgical difficulties in treating this ore and to work a lower grade. No great progress was ever made although lots of money was spent in these attempts but the results were never very satisfactory. My personal opinion is, that in some cases not enough money was furnished to accomplish the results sought. In other cases, too much money was furnished to do an economical job. Without adequate money no better results can be obtained on the Comstock than elsewhere in the mining world. Then again, if too much money is furnished and spent upon any property or group of properties a success cannot be made because the expenditure may be greater than the returns to justify such expenditure. Therefore, a happy medium should be considered between one and the other.

Metallurgy has improved to such an extent that what was considered pure waste rock on the Comstock in the early days is now highly payable ore; but, I must not overlook the fact that these mines, for a vertical depth of 1,600 ft. and an incline depth of about 2,300 ft. along the dip of the ore body are drained by the Sutro Tunnel, without the existence of which these mines could not work even with the high price paid for gold and silver today and with all the metallurgical skill it is now possible to obtain in working these ores because if these mines were allowed to fill with water it would be an impossible feat to pump them and drain them sufficiently to allow these difficult ore bodies, when wet, to be mined at a profit.

The ore bodies are separated by bands of clay and the ore bodies themselves

have much clay in the nature of seams passing through them. When they are wet, they become so heavy that it is doubtful whether any method of mining known today could be employed to successfully mine these ore bodies, consequently the Sutro Tunnel and its functions in draining the Comstock Lode is necessary to achieve whatever success these operating companies may enjoy today. This fact should not ever be overlooked. It is doubtful whether even the operators think much about what would happen if the Sutro Tunnel did not exist. Fortunately, the Sutro Tunnel is maintained by a strong company and is never allowed to get out of repair.

It may be considered by some people that pumping operations could take the place of the Sutro Tunnel. As already pointed out in this paper, even if the costs of pumping were moderate the costs of mining would increase to such an extent that I do not believe that we know of any ore bodies on the Comstock Lode today of sufficient size to warrant



W. J. Loring

the attempt to mine them with the idea of making a profit simply because mining costs would be so high caused by the impossibility of holding the ground that it would not be worth the attempt to operate them.

The Arizona Comstock was organized early in 1933 in a company having 2,000,000 shares. It is well known that at that time finances were difficult to obtain for anything in the shape of mining or any other enterprise, for that matter. The effort to finance this property was met with great difficulty; but, the company stuck together, raised a little money, made contracts for the supply of machinery of the second-hand class and finally got together a mediocre mining and milling plant—the mill consisting of one 64½ Marcy mill, one flotation machine of the eight-cell type, all well housed however in steel buildings

and work was commenced. It follows, naturally, that a 100 ton mill, unless the ore was extremely rich, could not pay on a physical set-up such as is the one comprising the properties of Arizona Comstock Corporation. The whole set-up is too big for a small tonnage proposition to say nothing of the difficulties encountered by floating the values at the time that this operation began.

The writer became associated with this company in September, 1933, as managing director in full charge of operations. It was proposed to raise \$450,000 in cash, at that time, in order to develop the known ore bodies in the mine and put them in shape so that they could be mined cheaply and with some thought as to operating on a practical scale. About 30 percent of the \$450,000 was supplied when this financial plan came to an end long before, of course, the goal that was laid down originally could be reached simply because of a lack of money to do things that were necessary to arrive at a satisfactory working condition that was within sight at that time.

It was apparent that the small mill referred to was too small to render a good account of itself, consequently a contract was entered into for the enlargement of the mill by the installation of further second-hand equipment which was really the only thing to do because new equipment could not have been purchased or contracted for by the company because of the excessive costs and the limited resources of this company to make the enlargement referred to. The result was that a second mill was installed which gave the operation a capacity of over 300 tons daily. Then, it became an acute problem as to where the ore could be obtained at the rate of over 300 tons daily because for the lack of cash underground developments were retarded to such an extent that the mine was only capable of producing, owing to the limited number of stopes, around 150 tons daily. The main reason for the limited number of stopes is because it was not possible to open up deeper levels or drifts far enough north and south, where additional ore is known to exist, due to the fact that there was no cash available for this work. Having had considerable experience in open-cut mining of the glory-hole type and also several other types of mining on the surface, the outcrop over the Norcross and Chollar and Potosi mines was sampled with rather indifferent results because a thorough sample could not be taken without an expenditure of a considerable amount of money which did not exist at that time. At the same time, it was decided by the writer to dig into this section of the outcrop that had been mined to a certain extent previously, with a gasoline shovel with the result that the second day after this work began payable ore was encountered. The result has been that mining underground was suspended and all of the ore for the mill has been supplied from the open cut with the exception of a few thousand tons that have been mined at intermittent intervals underground since May, 1934,



The combined width of the three veins at this point is 400 feet

with the added result that the mill has been kept fully supplied upon an increased tonnage basis which ranges between 10,500 and 11,500 tons monthly.

The open cut has produced, to July 31, 1936, 218,746 tons of ore. The underground has produced 49,591 tons, or a total tonnage of 268,337 from both underground and surface.

The overburden handled at the open cut, to date, has averaged 2.72 tons of waste to 1 ton of ore.

The average value of all ore milled, to date, has been \$6.03 per ton. The metallurgical loss to the end of July has been 2.20 per ton. There is impounded in the tailings dam a gross value of 444,578 tons of tailings. Preparation is now being made to treat these tailings by flotation and cyanide leaching.

Additional flotation machines have recently been installed of the second-hand type of Kraut machines. We now have 42 cells in the mill but the recovery is still unsatisfactory so far as flotation is concerned mainly because of the oxidized condition of the ore fed to this mill. At the same time, additional new reagents have been invented since these operations began which have all, coupled with the additional flotation machines, improved working conditions in the mill, increased the extraction upwards of 20 percent from what they were two years ago.

Since early 1934 no additional capital has been provided for this company although vast improvements have been made in the plant, sometimes on credit, but eventually the extraction has increased to such an extent that it reflects in the bank account. Consequently, in place of working in the "red" the company is working in the "black."

The costs are not satisfactory in some departments because of the antiquated machinery that is being used and the poor set-up of this machinery mainly because, as already stated, of lack of funds to purchase the proper kind of plant and

secondly, because it was never contemplated to mill more than 150 tons daily. Consequently, the plant that was purchased at that time, namely, the crusher plant, is now being strained in order to crush enough ore to supply the 10,500 to 11,500 tons monthly with costs that it is possible to reduce very materially. Likewise, other departments are in the same category.

The total costs for the first six months of 1936, in the treating of 59,679 tons are \$3.03 per ton before depreciation and depletion. The net cash gain from operations for this period is \$45,355.14 or 76 cents per ton. By the rearrangement of the crusher plant and several improvements in the milling plant there is a possible saving of 30 cents per ton below the record for the first six months of 1936. In reference to the net cash gain it must be remembered that these funds are used for the purpose of benefiting and improving the operating plant where a limited amount of cash can be spent which will have the greatest return. The balance has been applied to liquidating the debts of the company. The outlook of the company is very promising, indeed.

It must not be overlooked that the increased price of gold from \$20.67 per ounce to \$35, and silver from around 30 cents per ounce to 77½ cents has made possible the mining of the open cut on this property with an assurance of many thousands of tons ahead of these operations, it is hoped, of a like value to that already mined from this section of the property.

Very little preparation has ever been made in this open cut work to do more than dig ore for the mill just as we came to it without any preparation ahead or exploration work beyond the shovel. The shovel now used is a yard and three-quarter shovel and the ore is transported to the mill in 10-ton trucks.

The concentrate produced in the mill is cleaned by cleaner cells of the Kraut type. The concentrate produced is in two

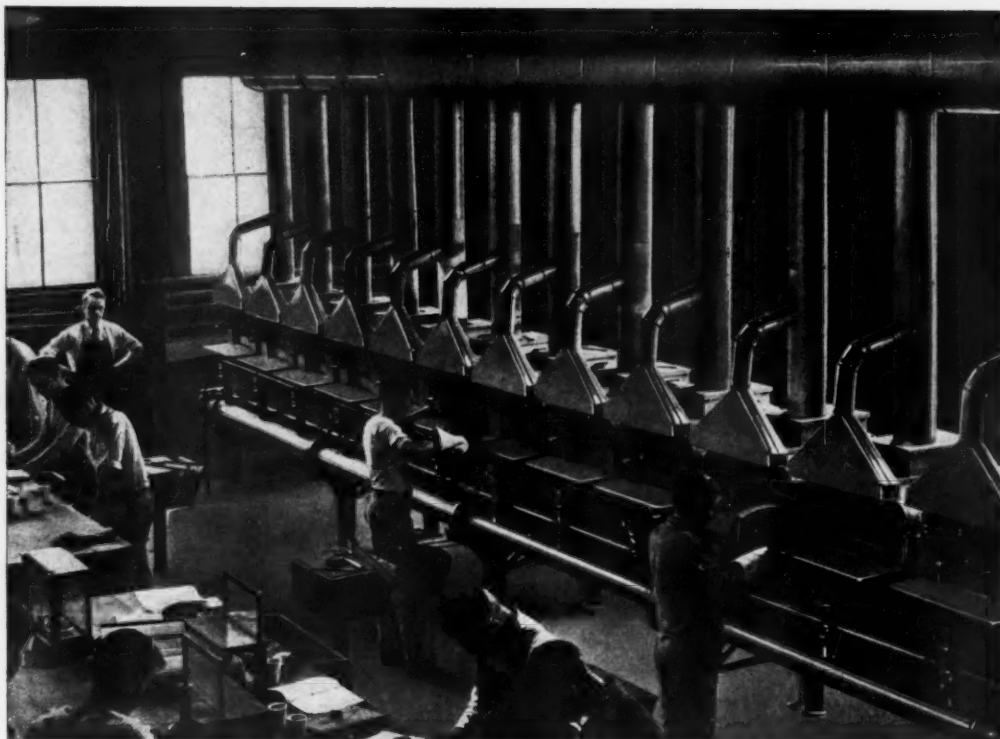
different values—one having a value of about \$175 per ton, and the other one \$3,000 per ton. It is contemplated to treat the low-grade concentrate by cyanide which process we are now about ready to commence. The high-grade concentrate will be shipped to the smelter at Selby, Calif., as has been done with the past output from this mine.

Preparation of the mine for the development of the known ore bodies is now underway and work will commence shortly in order to prepare to extract the higher grade ore from underground during the winter time when surface operations may be interfered with by stormy weather.

In addition to the open cut and underground sections of the property for the supply of ore for the mill, we have large waste dumps on the property that were placed there by early operators and a partial sampling of these dumps has isolated over 100,000 tons of about \$5 ore that may be used in case the open cut becomes tied up by stormy weather during the winter. The 100,000 tons so isolated does not by any means represent all of the ore that may be contained in these dumps. A thorough sampling has not yet been consummated of this possible source of mill supply.

This statement has been stripped of a lot of useless details and only a rough outline of this subject is given herein. If anyone should desire the company's operations full details may be obtained by those who are really interested in such work.

● **SUNSHINE MINING CO.** reported production of 2,582,205 ounces of silver for the third quarter of this year, making the total for nine months 6,138,918 ounces compared with 4,110,238 in the same period a year ago. The third quarter production is claimed to be a new world record for three months.



One of the largest installations of oil burning furnaces in the world

Determination of Gold Content in Ores

By P. J. RICHARDS*

ASSAYING gold ores (to determine their values) must start long before the sample arrives at the assay office. The assayer can do no more than determine the gold content of the sample submitted to him. If his result is an accurate measure of the gold content of a tonnage of ore, it is because a truly representative portion has been submitted to the assayer. Discrepancies in assays from two samples of the same ore body are usually greater than discrepancies in assays from the same sample.

If the assayer is to be held responsible for the valuation of a body of ore, he should make sure that his pulp really is a sample. If the pulp does not represent the ore body, it is not a sample, from the assayer's point of view.

*Richards Laboratories, Denver, Colo.

Sampling gold ore would be a simple matter if we had particles of uniform size to start with. It would then be a matter of reducing particle size in direct proportion to the reduction in sample size. Theoretically, this would result in a sample composed of the same number of particles as the original body and each particle would be a part of one of the original pieces. Each of the original pieces would be represented by a portion of itself in the final sample.

This ideal condition never occurs in crude ores. It is far more usual to find a body of ore containing pieces ranging from several pounds to particles small enough to pass through a 100-mesh screen. The comparative values of the fine and coarse materials making up the body may differ even more widely. Finally it is often true that the average value of crude ore does not justify a suf-

ficient outlay to provide for proper preparation and sampling. Such discrepancy in particle size does not occur in concentrates, therefore, they are easier to sample.

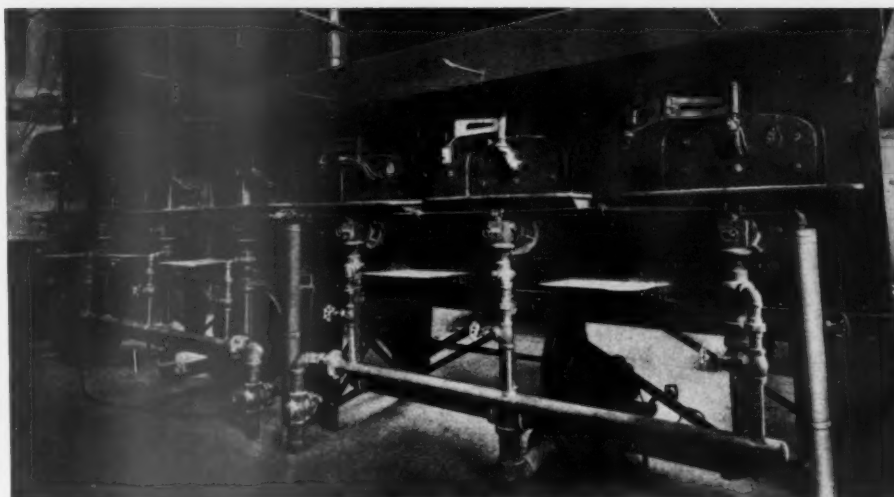
It is commonly believed that uniform sampling is good sampling and that uniform samples are samples that *check* when carefully assayed. According to this theory, if several samples are taken from a body of ore, they should be uniform and check one another within a very close margin. If they do not check, then a new batch of samples should be obtained, usually using the same method as before. If these second samples do not check each other, then the material is condemned as being impossible to sample accurately. As a matter of fact, either of the sample batches may have been representative of the value of that particular body of ore and the fact that individual samples in a sample batch do not check one another does not mean that the sample batch is inaccurate. It is much simpler to obtain a four-sample lot from a body of ore in such a manner that the four samples will check one another than it is to obtain a representative sample of that ore body.

Sampling equipment at first-class smelters and mills is usually adequate to handle any shipments they are apt to receive, and in most cases, sampling is in the hands of experienced men. It is to the advantage of the purchaser to obtain as accurate a sample as possible. Unfortunately, during the last few years, a number of small samplers and ore purchasing units have not allowed the seller to exercise supervision and inspection over sampling. This type of market is usually patronized by the small-scale miner, who must have prompt returns on his ore and often is forced to accept whatever is offered for his product. Sampling supervision on the part of the seller is encouraged in all of the larger smelters, which consider it an additional safe-guard to assure careful sampling on the part of their staff and to give their clients every assurance of proper service.

The assaying of gold ores is not a difficult procedure from either the mechanical or chemical phase. Experience seems to count more than theoretical knowledge.

A preliminary examination of the ore will give an experienced assayer much information about the required fluxes and treatment. In the determination of gold in ores, the gold is actually recovered from the ore, purified and weighed. This requires extreme accuracy in weighing as the usual charge of ore is only about one-half ounce. This amount is smelted under almost ideal conditions; the slag and impurities are poured off, the combined lead and gold and silver is then cupelled and finally the pure gold is weighed on a balance so sensitive that it must be protected from changes in temperatures and all air movement.

Gold and silver are usually associated in ores, and are recovered in the same manner. The fire assay is generally ac-



Illustrating Changeover from oil to natural gas

cepted, although methods based upon the solubility of gold in various liquids are sometimes used. We often hear wonderful claims for some new process which will give considerably higher results than the "standard" fire assay. Before taking advantage of any of these new developments, it is well to consider that the amount of gold in your ore that is of value to you is the amount that you can sell, and the fire assay determines that amount.

The results of the fire assay are not absolutely accurate, due to a certain loss of both gold and silver in the process. Probably the greatest loss is during cupellation when appreciable amounts may be absorbed in the cupel and carried off in the fumes. This loss may or may not be balanced by the fact that the gold and silver buttons which remain are sometimes contaminated by impurities; the silver with oxides and the gold with small amounts of silver. Corrections for these losses and contaminations are seldom made except in the assay of bullion.

The fire assay is essentially the collec-

tion of gold and silver in a lead button. This is accomplished by fusing the ore with the proper fluxes to obtain a fluid slag which will permit a separation of the lead into a button, and drive the impurities from the ore into the slag. If this is done properly, all of the gold and silver will remain in the lead button. After hammering the lead button to remove all slag, it is placed in a hot cupel where the lead is absorbed and fumed off leaving the comparatively pure gold and silver button. This button is then weighed, and from the results of this weight the gold plus the silver value of the ore can be calculated. If the gold assay alone is desired, then the silver can be dissolved in nitric acid. The remaining gold is then weighed, and the assay calculated therefrom.

Until a very few years ago, the scorifier method was used in a great many localities particularly for silver determinations. At the present time, the crucible method which will allow a considerably larger amount of ore to be assayed, is used. The use of niter as an oxidizing agent, and carbon or sulphur as a reducing agent is now widely accepted. This has taken the place of the old method of using nails for sulphide ores. However, during the last few years, methods of assaying gold ores have not developed as rapidly as materials and equipment.

Research on the part of supply and equipment houses is primarily responsible for the accurate results that can now be obtained in the modern assay office. With newer type furnaces to provide exact temperature control, chemically pure fluxes and highly developed precision balances, the trend has been to increase the accuracy in assay results by reducing the personal factor to a minimum.

Years ago, when accurate assay results had to be achieved in localities where equipment was difficult to obtain, and contact with the outside world was

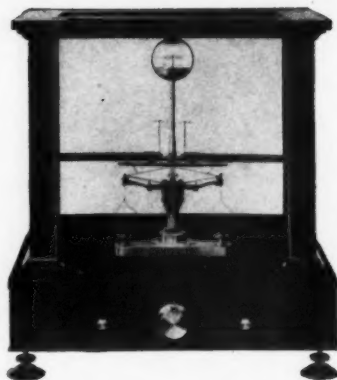


Unusually fine installation of coal-burning furnaces

limited to a very small part of the year, the accent naturally was placed on methods. Such a condition resulted in a high development of skill in manipulation and a thorough utilization of tools at hand.

But here again we find the stress is still being placed on check results, rather than on an average of many assays obtained from the same sample. Check assays on the same sample are easy to obtain on low-grade gold ore, but are difficult to procure on high-grade ore. It is almost impossible to get checks on high-grade ore containing any gold in the metallic form. With this type of material it is necessary to take an average of many assays. For control determinations on high-grade gold ore, the average of several assays must be taken. The number of determinations depend on the grade of ore and the manner in which the gold is distributed. Umpire determinations on high-grade gold ore should be the result of assaying all of the umpire pulp.

It does not make any difference how carefully an assayer may do his work or how much individual attention he may give samples that come into his care, he



Latest development of Wm. Ainsworth & Sons in gold assay balancers

will always be faced with the problem of failure to check some other assayer on what is described as an identical sample. All good assayers encourage check work, provided the checking is handled in such a manner that it does constitute an actual check.

Many assayers are running umpire and control samples and these, of course,

constitute the best possible check on their work because it gives them comparison with the work of other assay offices throughout the country. They are informed promptly if their results are not reasonably close to the mine assay or the smelter assay. In this way they have every opportunity to make whatever changes might be necessary to correct their own procedure.

Under these circumstances, it is improbable that any considerable error will be experienced in assaying mine samples, provided the mine samples are handled as carefully as the control and umpire determinations. However, it is improbable that any two mine samples taken from the same vein will check each other absolutely. It is also improbable that two portions of the same sample taken from the same vein will produce absolute checks. Of course, checks are impossible to obtain in the majority of cases if any metallic gold occurs in the ore. This brings us back to the necessity of knowing what it is we are assaying. Proper preparation is an essential of good sampling. A true sample is the first requirement in determining the value of gold ores.

Federal Power And Mineral Industries

(Continued from page 17)

jeopardized and that the power industries will join in a plan of fair prices, connected distribution lines, and a high order of service. The Government, we believe, should have unopposed freedom in the development of processes for production of war metals, and other power-consuming operations that industry cannot, or is not, disposed to carry on.

The following publications are recommended:

Mineral Resources and Possible Industrial Development in the Region Surrounding Boulder Dam. U. S. Bureau of Reclamation, 1934, containing contributions by U. S. Geological Survey and a paper by C. K. Leith and H. N. Eavenson.

U. S. Bureau of Mines Progress Reports—Metallurgical Division, 13. Electrometallurgical investigations by S. M. Shelton, J. Koster, and R. G. Knickerbocker. In course of publication.

U. S. Bureau of Mines Information Circular 6729, Manganese, by R. H. Ridgway.

Manganese; its occurrence, milling, and metallurgy, in five parts, by the staff of the Metallurgical Division. Published as Bureau of Mines Information Circulars 6768, 6769, 6770, 6771, and 6772.

Bulletins J, K, and M of the State

Electrometallurgical Research Laboratories, Pullman, Wash.:

J, applying flotation to the preliminary treatment of a Washington magnesite ore for the production of magnesium metal, by Howard Ziebell.

K, experimental results and methods of obtaining kaolinite from eastern Washington clays for the production of aluminum metal, by J. C. Kieffer.

M, the development of a sulphuric acid baking-roasting process and leaching process for the extraction of manganese from the high-silica ores of the Olympic Peninsula of Washington, by H. C. Parkman and Charles Durway.

Reports of the Federal Power Commission.

Report of Colorado River Commission of Nevada, including a study of proposed uses of power and water from Boulder Dam, Carson City, Nev.

Report of the Secretary of War upon Columbia River and minor tributaries, House Document No. 103, Seventy-third Congress, first session, in two volumes.

Report of PWA Federal Project No. 28, Bonneville Project, on the Columbia River.

First report of the Columbia Basin Commission of the State of Washington, Spokane, Wash.

Developing the mighty Columbia, by

C. H. Vivian; *Compressed Air Magazine*, September, 1933.

Grand Coulee Dam, by Harold O'Connell; *Compressed Air Magazine*, October, 1935.

Proceedings of the third annual convention, American Manganese Producers Association, Washington, D. C.

THE Federal Trade Commission this week issued a complaint against nine companies engaged in manufactures of turbine-generators and condensers, charging collusive bidding and fixing and maintenance of uniform prices. Among the larger firms named were General Electric, Westinghouse, and Allis-Chalmers in the action which grants the respondents until Nov. 13 to show cause why a cease and desist order should not be entered against them. The Commission's complaint, made after a lengthy investigation, alleges that the companies entered into agreements in 1933 to fix uniform prices for the purpose of eliminating competition. A lengthy complaint alleges submission of identical bids and identical performance contracts for machinery, although as a matter of fact the performance is not the same, all with the intent to lessen competition and monopolize the business. The complaint charges the companies with violation of Section 5 of the Trade Commission Act. The action is one of the largest and most important taken by the commission in the anti-trust field in several years.

Is Flotation the Last Word in Milling Practices?

THE title of this paper was suggested by the editor, and before starting a discussion of the question it seems advisable to establish a definition of the terms used in the title.

"Flotation" here probably means a complete process for the recovery of minerals from ores in which the minerals are brought to the surface of pulps and removed therefrom. "Final Word" implies the most economical method that has been or can be used, and "Milling Practices" doubtless means ore-dressing methods as distinguished from smelting or electro-metallurgical processes. In such an analysis, also, cyanide and amalgamation treatment of ores would be eliminated, thus leaving, so far as I am aware, only flotation and gravity methods as a basis for comparison.

In the differential separation of sulphide minerals in ores flotation methods are doubtless pre-eminent in present day practice, and an offhand opinion would select flotation as the "final word" in the treatment of ores containing such minerals. But sulphide minerals are not the only kind of minerals with which ore dressing methods are involved. How about oxide minerals, such as scheelite, cassiterite, hematite, chromite, etc.? If flotation is not the "final word" in the treatment of these ores can it sustain itself in the title? We know that in the treatment of ores containing free gold flotation has failed in a number of cases, but the title does not preclude the development of flotation methods until they will become the final word in the treatment of free gold ores as well as of oxide ores. From such a standpoint one might as well enter into a discussion of whether or not flying is the last word in transportation methods. Therefore, our discussion must be confined to present day developments in the two methods available.

Perhaps a look back into the past might help us in our problem. Twenty-five years ago gravity methods were predominant in the dressing of ores, and they were applied almost exclusively to the separation of one mineral from its accompanying minerals. And down to a certain point this separation was made economically and efficiently. That is, in lead milling down to what we called

"slimes" the grade of the product and the content of the tailings was as good or better than the present flotation results. It was only in the realm of "slimes," constituting some 15 percent of the total mill feed, that our difficulties existed, and this was the realm in which flotation played its important part. Then, of course, the problem of separating sphalerite from galena and chalcopryrite from pyrite, etc., became vital, and flotation, being so much more efficient than gravity methods in this field at that time, supplanted them almost entirely, and except for a few instances gravity methods were forgotten. The present tendency to inject gravity treatment in the phase between the ball mill and the classifier is a kind of "Rejuvenation of Aunt Mary," so to speak.

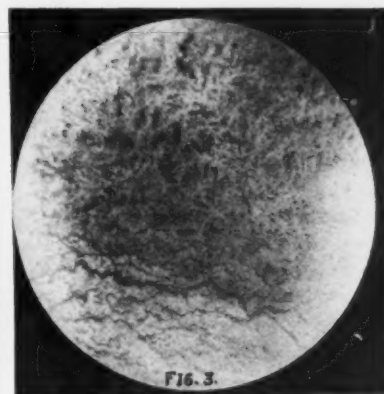
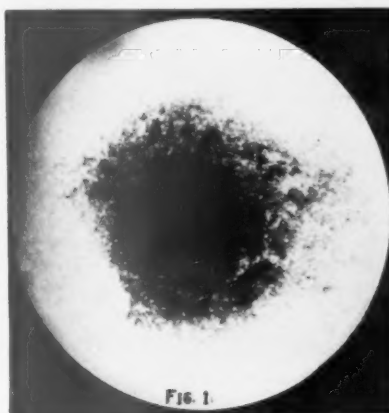
The Bunker Hill & Sullivan Company, on account of the favorable conditions in its smelting plant due to gravity products, is one of the last to cling to gravity methods in ore dressing, so that the principles of gravity concentration are not here forgotten, and I presume that is the reason the discussion of the question involved in the title was presented to me.

Now, just why is flotation superior to gravity in the separation of minerals

from gangues and from other minerals? Is it cheaper? No. Is it simpler? No. Is it more efficient? Yes, but why? There is one thing that neither flotation nor gravity can do and that is to separate two minerals that have not been freed from each other, so the question revolves around the separation of free minerals. Two minerals of exactly the same specific gravity could hardly be expected to separate by gravity unless their surfaces or shapes are different, yet it is possible to separate magnetite from pyrite by gravity methods if the magnetite is first coagulated by magnetic influence, just as galena is coagulated in the presence of sphalerite in flotation separation. So who knows what might have been accomplished in gravity methods if the same efforts had been concentrated upon them as have been devoted to flotation?

In this connection it will be remembered that the use of gravity methods on free minerals was very successful until the treatment reached the "slime" stage, and there it started a rapid decline. Why? Because in the slime stage the minerals, although largely freed from each other and in a state of extreme subdivision, were yet not free. They were enclosed in envelopes of gelatinous matter, or

By R. S. HANDY*



*Metallurgical Engineer, Kellogg, Idaho.

flocs, and instead of acting as free units were carried about in family groups, something as the "sooners" were carried to the land openings in the early days, and the valuable minerals, like the future Presidents, were indistinguishable in the mass. Another difficulty in making clean tailings by gravity methods in the treatment of sulphide ores was that the sulphides, when they came into contact with air or oils-and-air, had a decided tendency to float on the water-surfaces. Although these sulphide particles were often too fine to be visible to the eye, a deflector across the water surface of a concentrating table would divert a decidedly material film of these fine sulphides into the concentrate launder, and a screening-assay-analysis on the sand tailings from the tables would disclose a large proportion of the losses in the minus 325-mesh sizes in sands all coarser than that, this fine material being practically clean galena.

Illustrating the tendency of minerals in slimes to collect in gelatinous flocs, the accompanying photographs provide startling contrasts. Fig. 1 is a microphotograph of the primary slime in the mill circuit. It shows the minerals inclosed in gelatinous flocs and coagulated into a mass. Fig. 2 (a) is a photograph of a duplicate sample of this slime after treatment in a centrifuge, showing the gelatinous mass collected in the bottom of the centrifuge tube, with clear supernatant liquid. Fig. 3 is a microphotograph of a deflocculated sample of the same slime, showing the gelatinous matter dispersed and the individual grains of mineral released and spread over the surface of the plate. Fig. 2 (b) shows the deflocculated pulp after identical treatment in the centrifuge with the pulp in Fig. 2 (a). Here, the mass of individual crystals of mineral is collected in the bottom of the tube, while the dispersed gelatinous matter is in suspension in the supernatant liquid.

The reactions of these two types of mineral pulps in flotation and in gravity treatments are as distinctly different from each other as they are in the centrifuge. In order to illustrate this difference the following tests were made:

A sample of the overflow of the Esperanza classifier treating the primary slime from the mill feed after it is crushed in rolls to pass 7 millimeter in size was divided into three identical portions. The first portion was treated in the laboratory flotation machine as follows:

1. The pulp was agitated for 8 minutes with 0.3 lb. per ton of sodium cyanide,

0.5 lb. per ton of soda ash, 0.5 lb. per ton of zinc sulphate.

2. There was added 0.2 lb. per ton of a mixture of 90 percent Barretts oil and 10 percent pine oil, and the pulp was agitated for 1 minute.

3. There was added 0.05 lb. per ton of ethyl xanthate and the froth was skimmed for 5 minutes. Considerable low grade froth was still rising at the end of 5 minutes.

4. The remaining pulp was agitated for 4 minutes with 0.6 lb. per ton of copper sulphate, 4.0 lbs. per ton of hydrated lime, 1.0 lb. per ton of ammonium sulphate.

5. There was added 0.10 lb. per ton of ethyl xanthate, and the froth was skimmed for 4 minutes. A froth of extremely fine grained pyrite was still rising at the end of the skimming period.

The second portion of the slime sample was deflocculated with 2.0 lbs. per ton of sodium silicate and settled and deslimed by decantation. The resulting sands were treated by flotation in an identical manner with that described above. The first concentrate was clean and bright and all of the froth had formed within three minutes after skimming started. The second froth came off completely in one minute. The results of the two flotation tests are shown in Table 1.

These results show the marked difference in the two pulps. In the normal

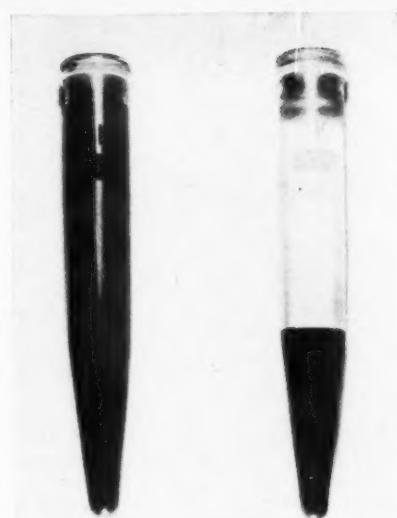


Fig. 2 (b)

Fig. 2 (a)

pulp the depressants for zinc and iron were effective, while in the sand-pulp identical quantities of depressants were practically ineffective, indicating that the colloidal matter is the principal agent in depressing minerals. While the percentage recovery of the galena was markedly higher in the treatment of the sand-pulp than in the normal pulp, the sum of the lead contents of the sand-pulp tailing and the slime from the deflocculation treatment practically equals the lead content

TABLE 1

FLOTATION RESULTS ON NORMAL VS. SAND-PULP									
Product	Pct. Wt.	Assay				Total			
		Pct. Pb.	Pct. Zn.	Pct. Fe.	Pct. Insol.	Pct. Pb.	Pct. Zn.	Pct. Fe.	Pct. Insol.
Normal Pulp									
Pb. Conct.	13.6	37.60	13.5	9.0	14.8	75.5	35.0	8.3	4.5
Zn. Conct.	8.0	6.04	35.8	10.0	15.6	7.1	54.5	5.4	3.0
Tailing	78.4	1.50	0.7	16.2	53.0	17.4	10.5	86.3	92.5
Total	100.0	6.92	5.2	14.7	44.8	100.0	100.0	100.0	100.0
Sand-Pulp									
Pb. Conct.	18.0	30.50	16.5	12.0	7.5	82.6	56.5	14.9	3.1
Zn. Conct.	4.8	2.82	37.0	10.5	17.8	2.0	33.7	3.4	2.0
Tailing	60.6	0.93	0.5	16.9	54.3	7.5	4.6	70.1	75.8
Slime	16.6	3.15	1.5	10.2	50.0	7.9	5.2	11.6	19.1
Total	100.0	6.85	5.3	14.6	43.4	100.0	100.0	100.0	100.0

TABLE 2

SIZING ASSAY ANALYSES OF FLOTATION TAILINGS									
Mesh	Pct. Wt.	Assay				Total			
		Pct. Pb.	Pct. Zn.	Pct. Fe.	Pct. Insol.	Pct. Pb.	Pct. Zn.	Pct. Fe.	Pct. Insol.
Normal Pulp									
On 200	6.6	0.90	2.30	10.1	70.44	4.0	22.8	4.0	9.0
On 270	5.4	0.96	1.10	13.6	59.54	3.5	8.9	4.4	6.2
On 325	4.6	0.98	0.75	16.0	52.87	3.0	5.3	4.4	4.8
Minus 325	83.4	1.59	0.50	17.3	49.51	89.5	63.0	87.2	80.0
Total	100.0	1.48	0.66	16.5	51.59	100.0	100.0	100.0	100.0
Sand-Pulp									
On 200	5.0	0.85	2.00	8.5	71.92	5.0	15.0	2.5	6.8
On 270	4.0	0.72	1.00	14.0	62.17	3.4	10.5	3.3	4.7
On 325	4.6	0.62	0.70	15.3	56.81	3.4	9.4	4.1	4.9
Minus 325	86.4	0.86	0.40	17.7	50.86	88.2	65.1	90.1	83.6
Total	100.0	0.84	0.52	17.0	52.64	100.0	100.0	100.0	100.0

of the tailing from the normal pulp. This is explained by the sizing assay analyses of the respective tailings shown in Table 2, where it will be noted that the lead assay of the minus 325-mesh portion of the tailing from the normal pulp is nearly twice that of the corresponding size in the sand-pulp tailing. The action of flotation on the extremely fine portion of the normal pulp was evidently completely ineffective.

Similar effects to those described have been apparent in gravity concentration. In the days when Frue vanners were in use comparative tests were made on normal and deflocculated and deslimed pulps, all minus 200-mesh in size. On the normal pulps the best practice with vanners gave a capacity of about 2.5 tons per 24 hours per machine and the recovery of lead was about 55 percent and the grade of the concentrate about 52 percent lead. When the sand-pulps resulting from deflocculation and desliming were treated on the same vanners the capacity jumped to nearly 20 tons per 24 hours, the recovery of lead to 87 percent and the grade of the concentrate to 75 percent lead. While none of these results on the sand-pulp was superior to corresponding flotation results, they were at least comparable and could doubtless have been developed into competitive methods.

Although no efficient means of making laboratory tests comparable with vanner work are available, the third section of the pulp tested by flotation as described above was deflocculated and deslimed, and the sands were panned in stages in a special plaque into four products, as follows:

TABLE 2

Product	Assay			
	% Pb.	% Zn.	% Fe.	% Insol.
Product No. 1....	23.5	1.0	23.0	1.9
Product No. 2....	10.2	3.3	32.0	2.7
Product No. 3....	3.7	7.9	23.6	22.8
Product No. 4....	0.9	1.9	8.0	70.5

There is here shown a decided tendency toward the differential separation of the lead and the zinc, with a lead product superior in zinc content to that resulting from flotation treatment. On the normal pulp similar panning treatment gave no differential results worth while. In panning the sand-pulp the sulphides showed a normal tendency to float off on the surface of the water, but a simple treatment of the pulp prevented this tendency on the part of all the minerals, so that the gravity effects were positive.

In treating oxide ores and other ores not amenable to flotation the deflocculation and desliming of the finely divided portion of the pulps permits distinctly high recoveries and high-grade products to be made by gravity treatment on standard machines with simple changes to adapt them to the requirements, and I look for the trend of the future to swing away somewhat from flotation as a panacea for all the ills of ore dressing toward gravity methods wherever they are effective.

World Markets for Non-Ferrous Metals

(Continued from page 24)

foreign metal is already available here in bond, brought hither in ore. There is, furthermore, the matter of internal freights on transportation to places of consumption, the lower rates of duty on metal from foreign ores smelted here, and so on. Practically £13.5 London, and 4.90 cents St. Louis, for spelter is regarded as being about the same thing, and our spelter price cannot be advanced without running risks. On the other hand, the margin in our favor in respect of lead is so large that our lead price might be advanced substantially without risk if it were not restrained by domestic factors. One of the latter is the supply of old lead from battery scrap that is constantly coming back. During the last five years, 1931-35, such come-back has ranged from 103,000 to 143,000 tons per annum, in terms of recoverable lead. This battery scrap accumulates in a multitude of service stations, etc., wherein there exists an unknown, but in the aggregate probably large, stock at all times. Our statistical studies reveal quite clearly that when the price for lead falls that return flow tends to freeze, but when the price for lead rises it tends to thaw. That is not our only controlling factor, but it is one of them, and an important one, and must be taken into account in any consideration of the domestic lead market.

The reflux of old copper has the same effect upon its market. Zinc has heretofore been immune from such competition, but with the come-back of old die-casting metal it is no longer immune.

I explained this important subject in a talk to the Mining and Metallurgical Society of America last winter. I may usefully summarize some of the major conclusions. Except from dissipating uses, old metal is constantly returning from demolitions. Being recovered more cheaply than the production of new metal, it takes precedence. The reflux of old metal is, therefore, relatively constant, and when consumption is low it supplies a large proportion of it, but when consumption is high only a small proportion. If we had a domestic consumption of copper at the rate of 45,000 tons per month we might expect one-third of it to be satisfied with old copper. At 60,000 tons per month, about one-fourth. At 90,000 tons per month, about one-sixth. The same principle obtains in lead, although the ratios may be different. The reflux of old metal in Europe is less than with us. Our statistics of consumption ex-U. S. A. are expressed in terms of new metal. In U. S. A. in terms of both, old and new.

I should mention another dislocation in respect of zinc. In the United States a good deal of our consumption is satisfied by production directly from ore, without any intermediate conversion into spelter; e.g., zinc oxide, zinc sulphide for lithopone, etc. Direct galvanizing has been instituted and may extend. In Europe,

so far, this by-passing so-to-speak occurs to a very much less extent. This is a subject of some importance in comparing the American and European statistics of zinc production and consumption.

I have aimed in this paper to confine myself to a summary of facts and there is but little of opinion and scarcely anything of prophecy introduced into it. In respect of opinion I shall revert to my introductory paragraphs and reiterate that upward trend in the consumptions of the metals will coincide substantially with the broad economic index. It is reasonable to think that it is still trending upward. With such a trend prices also generally move upward, tempered by producing capacity and the organization and attitude among producers. In respect of copper, lead and zinc I have sufficiently outlined such conditions heretofore.

American Coal Preparation Practice

(Continued from page 46)

per square foot of filter surface per hour. In all, there are 12 filters operating on coal, all in the bituminous region, and their combined filtering area is about 5,680 sq. ft.

We have noted numerous references in the foreign technical press dealing with the use of coagulating agents for water settling, and there are some developments along these lines now going on in the United States, but not by any means to the extent that it is being done in England. We believe, however, that mechanical thickeners are better adapted to this use than settling cones.

Closed water systems are becoming more common, particularly in regions like the Pittsburgh District, where it is not permissible to waste black water into the streams. In this connection, the European trend towards aspiration of coal before washing, in order to minimize dust and sludge troubles, has not gained any headway in the United States.

It is true some plants are aspirating dust from coal, but it is done on a raw product sold as such or on a cleaned product, and not for the purpose of eliminating the dust or sludge problem in so far as the cleaning operation is concerned.

The feed to the Chance cone is screened at from 5/16 in. to 1/4 in., but we do not consider this as being true aspiration, as the fines may then be mixed back raw or air-cleaned. Many of our mines are wet, at least in part, and it is doubtful whether aspirating, particularly at some of the large tonnage plants, will produce efficient results.

Cleaning of fine coal by flotation has not received as much attention here as it has in Europe, and there is now only one plant operating on a commercial scale, handling 5,000 to 6,000 tons per month. The equipment is of the mechanical agitation type.

Placer Mining in California

With Power Shovels

WHEN the financial depression finally reached California with full force in 1932, many contractors who had been employed on highway construction, excavations for buildings, dams and other forms of earth-moving operations, were left unemployed with sometimes large inventories of equipment idle on their hands. These men argued that they should be able to make a success of surface placer mining for gold, which they pictured as a simple job of digging, transporting and washing sand and gravel. The more enterprising among them began operations with little preliminary prospecting or investigation, with the result that many of them failed. Their work, however, and the increased gold price, attracted the attention of more experienced and careful men who evolved a method of shallow placer mining which is proving successful under proper conditions. The essential items of equipment for this work are a mobile drag-line for excavation and a floating barge carrying the washing plant. Such an outfit is locally known as a "doodle-bug" dredge.

Areas Adapted to Small-Scale Mechanical Placer Mining

In a general way, mining engineers and placer operators have long known of scattered parcels of land carrying gold in too small quantity for profitable mining by hand, but where the yardage of available gravel was too small to justify a bucket dredge, and where conditions did not permit hydraulic mining. Such deposits may be successfully worked by mechanical shovels or drag-lines under certain favorable conditions, the most important of which are: (1) Shallow, uncemented gravel without too many large boulders, (2) soft bedrock, (3) gold content from 2 to 4 times greater than would be required for a bucket dredger, (4) water supply, (5) sufficient yardage. These areas of land are found principally along the rivers or small streams in the lower foothills on the east side of Sacramento and San Joaquin Valleys, and also in some of the other gold mining counties. Geologically, the deposits may be creek or river gravel, or ancient shore-line deposits dissected and reconcentrated by modern streams.

* Mining Engineer, California Dept. of Natural Resources.

By C. A. LOGAN*

Types of Equipment Used

A great variety of earth-moving equipment has been tried, with mixed success, in exploiting these deposits. The mobile drag-line with floating washing plant has been most successful. Stationary drag-lines, steam or gasoline shovels with trucks to transport gravel to a stationary washing plant, and tractor-operated scrapers ("bull dozers") have been used. Some people of visionary and inventive minds have worked out expensive and usually impractical outfits which generally have a short life.

Drag-Line Dredges

Stationary and mobile drag-line outfits have been used extensively for years to dig and load sand and gravel and their characteristics are well known. Their use in gold placer mining however, introduces some undesirable factors such as (1) intermittent supply of feed to the washing plant, (2) constant churning up of the gravel being dug with gold settling to the bottom and a muddy water supply, (3) lost time for moves, servicing and repairs. The low initial cost permits amortization of plant to be realized on a few acres of good gravel. The entire plant can be easily and quickly moved. It is doubtful, if in skilled hands, the loss of gold is much greater than with standard dredgers, though it is certain that some operators have not made a good saving of gold. The yardage handled even by one of these outfits is too large to make it likely that special machines or processes can be used to save the fine, flaky or rusty gold that is lost. Improvement must come therefore in the riffles used as standard equipment, and experimentation to determine the proper grades for sluices, the water supply, most suitable sluice area, mercury traps and proper screening.

Wyandotte Gold Dredging Company.

This company which started work on Wyandotte Creek, southeast of Oroville in December, 1933, was composed of men who had technical training and practical experience in mining as well as in the use of excavating machinery, and have been more consistently successful with their numerous drag-line ventures than any other outfit in the business. This success has been due not only to hard work, but to careful prospecting of the ground, close attention to gold-saving equipment and operating details and costs. They have installed and operated several plants in Butte and have also operated in Placer and Shasta Counties. They justly place a cash value on the detailed specifications of the equipment which they have found most suitable for the work, and have been reluctant to have full details published, but the main items may be described.

The work on Wyandotte Creek has been done on a typical deposit of loose, fine to medium-sized creek gravel, on a soft bedrock of clam or decomposed "porphyry." Prospecting was done by sinking shafts about 4 ft. by 6 ft. in cross section, and washing the gravel twice in a rocker. Part of the ground was covered with soil and sand overburden, which is easily moved off by the drag-line if found to be not worth washing. Two plants were in operation when visited. The older one was using a P. & H. 600 A Excavator, operated by a 115 hp. Buda Diesel engine. It had a 40-ft. boom and used a 1½ cu. yd. bucket. The wooden barge carrying the washing plant was 30 ft. by 40 ft. The welded steel plate hopper receiving gravel was 10 ft. by 11 ft. with a grizzly of 90-lb. rails spaced 12 in. (16 in. centers). The trommel is of Link-Belt make, 54 in. by 24 ft. with ¾-in. holes in the screening section. This company had experimented

considerably with screens. Close spacing of holes was found to result in overloading the head sluices. When the spacing between holes was increased to 1 in. and 1½ in., center to center, and all holes staggered, the life of the screen was increased and distribution of pulp was better. Riffles were carried in 8 sluices 24 in. by 12 ft. and in 40 ft. of sluice 40 in. wide on each side. Riffles were made up from 1-in. lumber dressed to about ¾-in. thick, 1¼ in. deep and spaced 1¼ in. apart, on a grade of 1¼ to 1½ in. per ft. Mercury traps 8 in. wide were placed in each of the 4 upper boxes. Upper edges of riffles were covered with barrel hoop iron 1 in. wide.

Power for pumping water and operating the screen and stacker was furnished by a No. 50 Caterpillar Diesel engine, rated at 62 hp. Sixty miners inches of water was purchased, and was supplied to the trommel and hopper by a centrifugal pump with 7-in. discharge. The proportion of sand to water, or water duty, varied on account of the unequal distribution of pulp through the screen to the various sluices, and also with the composition of the ground being worked. The average fine tailing is probably 10 percent to 15 percent of sand as discharged from the side sluices, unless especially sandy ground is being worked.

This outfit handled about 128 cu. yd. an hour, and had under favorable conditions an average running time of 17½ hours or better out of 24, giving a total up to 2,200 cu. yd. daily. From 5 to 8 minutes was required for making a move. In soft ground timber mats are used under the drag-line treads, and more time is required. If an average of 16 hours of actual digging is maintained out of 24, it is creditable.

Different operators have their favorite engines and make special claims for them. In this case, remarkably low fuel costs had been achieved, using Diesel oil. The operators reported the two engines were using only about \$5.25 worth of fuel daily. The cost of lubrication would bring the total to scarcely \$7 a day.

Lights are furnished by Kohler light-plants.

Buckets also have been the subject of much experimentation, here and elsewhere. Each type of several tried was found to have certain advantages and limitations. Page standard and heavy duty buckets seem to have been favored here. A set of manganese steel bucket teeth is dulled each shift. They are built up by the welder and give 3 or 4 months service with ordinary wear.

Fine tailing discharges from the side sluices several ft. behind the barge. The belt conveyor for coarse material was 35 ft. long, 2 ft. wide and traveled about 200 ft. per minute.

With this plant, the company has reported operating costs reduced from 16 cents a cu. yd. at the start, to 10 cents after 18 months' experience. A still further reduction was anticipated, and is believed to have been realized, with new outfits put in operation since then. The

older plant is representative of many in use the past two years in California.

Cost of Drag-Line Dredging Outfits

As mentioned elsewhere, contractors with idle excavating equipment were among the first to start drag-line dredging. If they did not own the drag-line outfit which was the most expensive plant item, they could usually buy more advantageously than the average company. Therefore, many of the earlier outfits, using second-hand digging equipment and engines, and washing plants with light, cheap screens and hoppers, were assembled and put in operation at total costs claimed to vary from \$12,000 to \$20,000, of which a large part was often not a new capital outlay, but in the shape of equipment of which the original cost had perhaps long since been recovered by profits of operation on other jobs.

When outside companies came into the business with new machinery of standard grades, the capital outlay has been found to run around \$40,000 by the time digging started.

The principal items of this outlay were:

APPROXIMATE COST NEW OF PRINCIPAL ITEMS, DRAG-LINE DREDGES

Drag-line (1¼ to 1½ cu. yd. bucket, 50-ft. boom).....	\$14,000-\$16,500
Spare bucket	1,000- 1,200
Diesel engine power for drag-line.....	3,700- 5,000
Washing plant complete, including wooden barge 30 ft. by 40 ft., standard weight hopper, trommel, pump, engine, etc.....	12,000- 14,000
Shop, auto truck, welding outfit, etc.....	3,000- 3,500
Composite total derived from several cases.....	\$33,700-\$40,200

Although the drag-line can be used to remove overburden, in some cases operators may prefer to use tractors or "bulldozers." The above costs assume that water is delivered to the dredge by gravity. If a well and/or a pumping plant are required, an additional sum of \$2,000 to \$3,000 must be added.

The life of some of the units is limited and a monthly charge should be allowed of from \$1,000 to \$1,500 for maintenance, repairs and replacements.

If water supply has to be purchased, as is usually the case, this may cost as much as \$175 a month.

From 10 to 14 men are employed on one of these outfits, and there is quite a variation in labor costs between a case like Wyandotte Dredging Company when one or more of the partners works long hours, and a stock company with a paid superintendent or manager who does little or no actual labor. The labor item may therefore vary from \$1,800 to \$2,800 a month, including compensation insurance, but not the wages of a special Diesel engine mechanic whose time may be divided among several plants in some districts.

Total operating and maintenance costs may therefore vary from \$3,500 to \$5,500 a month. The equipment and operating routine for this class of work have not been standardized to the point where it is

possible to make many definite statements as to total operating cost per cu. yd. This cost is dependent on the type and quality of equipment, the ability and experience of those in charge, and the character of the ground being worked. There are great variations in all these elements. Operating costs reported to the writer have varied from 4¼ cents to 25 cents per cu. yd. in place. The lowest cost, equal to that applying to the largest bucket dredge operations, is not at all representative. It is claimed to have been achieved on a deposit of very loose gravel covered with loam where a capacity of 225 yd. in place per operating hour was reached, working in ground 8 to 12 ft. deep, and operating 18 hours out of 24. The other extreme, 25 cents a yd., was reported by one of the earlier installations on a dissected shore-line deposit, where the "pay-streak" was difficult to follow and the operators were learning the business. Generally speaking, operators who have been successful on what may be called average ground have been lowering their costs as they gained experience, reducing the figure from 16 cents to 8 cents a cu. yd.

How much should be added to these figures to arrive at total cost for any particular operator will depend on the successful life of his plant, and cost of land or royalty paid. Few concerns have enough ground in reserve to realize the full life of their major equipment. Some of these outfits have already passed through several hands. They can be dismantled and moved readily about the state with small loss of time. Obtaining figures for amortization in such cases is difficult. If an operator has been fortunate enough to obtain in one holding 2,000,000 cu. yd. of gravel that will pay to work it would be unusual. A minimum of 1,000,000 cu. yd. is desirable to warrant starting operation.

The above discussion has been based on the use of Diesel engines for power. In some cases, where electric power transmission lines are near the site of proposed operations, electricity may be used with less first cost for power equipment and, it is claimed, less lost time. One outfit near Lincoln uses electricity to run the washing plant, and one in Calaveras County uses electric power throughout.

The other differences between the various plants are principally in the size of the barge carrying the washing plant and its draught, varying with area and load;

(Concluded on page 58)

Statement of the Grand Jury of the county of New York, to the Court of General Sessions Regarding Stolen Anthracite Coal

AFTER this grand jury was impaneled it was informed by the district attorney that its function was to investigate the alleged commission of crimes in New York County involving the transportation into the county of New York from the state of Pennsylvania and the purchase, receipt and sale in this county of stolen coal in violation of the penal law of the state of New York. In our investigation of the commission of certain specific crimes in violation of the penal law, our interest to inquire into the conditions under which such specific crimes flourished was excited and in a subsequent general inquiry our attention was drawn to the revelation of a picture of commercial crime and its tolerance in high quarters unprecedented in the history of this country. Beginning in the commonwealth of Pennsylvania during a brief span of four years a situation has resulted, the repercussions of which are felt not only in the county and state of New York, but also in other areas. It involves an illegitimate traffic in stolen property which seriously threatens legitimate industry, legitimate trade and legitimate labor. It involves violation of commercial ethics through the wholesale imposition of stolen anthracite coal upon the consuming public.

Emboldened by the inaction of government officials, the coal thieves have organized The Independent Anthracite Miners Association for the sole purpose of defending their so-called right to carry on this organized robbery. Their articles of association repudiate all conception of property by declaring that the coal was put into the mountain by the Creator and was stolen from them by the coal operators and bankers, and that, therefore, they agree to use their organized strength to maintain their right to dig this coal. The association constitution provides that after a certain date, coal holes, referring of course to the holes maintained by coal thieves, shall be not less than 60 feet apart, and that the executive board shall assess each coal hole to repair trespassing roads to and from the hole; that any hole destroyed by a coal company will not be protected by the association, except in the case of members thereof.

We have presented a picture of a condition fantastic and incredible. Reasoned consideration moves us to a candid statement. This is not a situation which permits of compromise but one which demands affirmative action. In this spirit we have been led to the following conclusions:

I. That under our system of society and our accepted moral standards, there is no more justification and no less danger in condoning organized traffic in stolen coal than condoning traffic in any other stolen property.

II. That ordinary comity between states imposes an obligation upon the commonwealth of Pennsylvania to stop this condition of anarchy which results in a flow of polluted commerce into this state and thus imposes upon our taxpayers the heavy burden of enforcing the law against contraband commerce.

III. That every consideration, practical and moral, calls for prompt and effective action by the commonwealth of Pennsylvania to stop this evil. The city of New York should not be put to added expense to rectify wrongs which originate from the neglect of an adjoining state, and from a practical viewpoint, it is far easier to stop the stream at its source, than to dam its swollen waters at the border of a city. Moreover, action by the commonwealth of Pennsylvania will protect not only this city, but the cities of other states, and will eliminate the numerous trucks laden with stolen anthracite which now block the highways from the commonwealth of Pennsylvania to adjoining states.

IV. That pending adequate action by the commonwealth of Pennsylvania, it is necessary for the protection of the citizens of our county, city and state, that every effort be made to stop this unlawful traffic through the rigid enforcement of the penal law.

V. That this criminal traffic demands the attention of our lawmakers as well as the law-enforcers, in order that there may be considered and enacted, further remedies, both civil and criminal, to protect our citizens in the lawful pursuit of a livelihood and to protect the consuming public from fraud and other unfair merchandising practices.

Consistent with our conclusions, we therefore make the following recommendations:

First. That the governor of the state of New York memorialize the governor of the commonwealth of Pennsylvania to take appropriate action.

Second. That the legislative bodies of the city and state of New York consider and enact proper protective legislation.

Third. That the district attorney of the county of New York and the police

department of the city of New York continue in their efforts to end this criminal traffic in stolen coal.

Fourth. That this grand jury be continued until the day of October, 1936, for the purpose of further dealing with this menace.

Dated, New York county, Wednesday, September 16, 1936.

NICHOLAS L. STOKES,
Foreman of Additional
August Grand Jury, 1936.
LOUIS JAUL,
Secretary.

Excerpts from release of the Anthracite Institute.

Placer Mining in California

(Continued from page 57)

and in the length of booms and types of bucket on the drag-lines. A late development has been the sectionalized steel hull of pontoons that can be quickly disassembled for moving to a new site. The wooden hulls in common use vary from 26 ft. by 30 ft. to 30 ft. by 40 ft. in deck area and draw from 13 in. to 25 in. of water.

No other method of working these shallow deposits with power equipment, except the smallest of the bucket dredgers, appears to have been as successful on limited acreage or as cheap in operating cost as the mobile drag-line of the type described. Shovels with steam, gasoline or Diesel power have been tried for short periods at many places, usually loading trucks to transport gravel to stationary washing plants. The operating cost with these outfits is comparatively high. The stationary plant, whether fed by a shovel, fixed drag-line or tractor-operated scrapers, is likely to be surrounded by tailing piles in a short time and thus put out of business unless the tailings are moved.

The small bucket dredger, with buckets of 2½ to 5 cu. ft. capacity has distinct advantages over the drag-line. It not only allows a more uniform feed to the washing plant, but with extensions on the digging ladder will permit working considerably deeper than the 18 to 20-ft. limit of the drag-lines.

● **JOY MANUFACTURING COMPANY** received an order for 68 snow loaders, amounting to approximately \$478,125 from New York City. Delivery is scheduled for January 1, 1937.

PETER F. LOFTUS

Consulting Engineers

ENGINEERING AND ECONOMIC SURVEYS, ANALYSES AND REPORTS ON POWER APPLICATIONS AND POWER COST PROBLEMS OF THE COAL MINING INDUSTRY

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News and Views

of Interest to Mining Men

● IN CONNECTION with the Third World Power Conference at Washington, a post-conference tour of the Fuel Section met in Pittsburgh, September 15 and 16. On Tuesday and Wednesday mornings the delegates made a trip of inspection to coal mines and cleaning plants in the Pittsburgh area, and a round-table discussion was held Wednesday evening at the William Penn Hotel. The meeting was attended by representatives from foreign countries, as well as a number of men from the United States.

Dr. Howard N. Eavenson, consulting engineer, presided at the round-table discussion as chairman, with Dean E. H. Holbrook, of the University of Pittsburgh, as vice chairman. The following program was presented:

Paul Weir, vice president, Bell & Zoller Coal & Mining Co., "Latest Developments in Coal Mechanization"; followed by a motion picture taken at the mines and plant of Bell & Zoller Coal & Mining Co.

W. J. Drummond, representing the British National Commission of the Mining Association of Great Britain, Newcastle-on-Tyne, "Mechanization in the British Mines."

George Deike, president, Mine Safety Appliances Co., "Recent Advances in Mine Safety Practices and Equipment"; followed by motion picture showing uses of electric cap lamp.

Dr. George Spackler, professor of engineering, Breslau University, Germany, "Stresses in Mine Roof Action." Julius Herald, chief chemist, Pittsburgh Coal Co., acted as interpreter of Mr. Spackler.

J. B. Morrow, preparation manager, Pittsburgh Coal Co., "New Methods of Coal Cleaning"; illustrated by a series of lantern slides.

Dr. F. S. Sinnatt, director of fuel research, Fuel Research Station, Greenwich, London, "Scientific Research for Coal Cleaning."

Dr. Van Iterson, vice president, State Collieries, Heerlen, Holland, "Coal Cleaning."

Dr. L. E. Young, vice president, Pittsburgh Coal Co., representing the Engineering Society of Western Pennsylvania, spoke at the conclusion of the meeting, thanking the gentlemen who had presented papers and discussions and all those who had participated in the program.

Following is the list of delegates from foreign countries:

Alfred Bayer, Kommerzienrat, Generaldirektor, Pfalzwerke Aktiengesellschaft, Ludwigshafen on Rhein, Ger-

many; Richard Imbt, Oberqurgmeister-Neustadt, Germany; Arthur Pfeiffer, Direktor, Statische Werke, Neustadt on Uter reutschen Weinstrasse, Germany; Willis Schelmelcher, Germany; Dr. Ing. Prof. George Spackler, Breslau Technical High School, Germany; Dr. Eric Wursner, Braukohle-Beufte, A. C. Berlin, Germany; W. J. Drummond, M. Inst. C.E., M.I., Mech. E. Rep. on British Ntl. Comm. of the Mining Assn. of Great Britain, the Ashington Coal Co., Ltd., Milburn House, Newcastle-on-Tyne, Great Britain.

Mr. and Mrs. E. G. Fottrell, Great Britain; Mr. and Mrs. Thomas Hardie, director and formerly chief engineer Gas Light & Coke Co. and past president, Institute of Gas Engineers, Great Britain; Mr. and Mrs. Robert Watson Hunter, chief engineer, Gas Light & Coke Co., London, Great Britain; Dr. F. S. Sinnatt, director of fuel research and member, executive, British Natl. Comm. of World Power Conference, Fuel Research Station, Greenwich, London, Great Britain; Malcolm Duncan, U. S. A.; Eng. Ricardo Fenner, Santiago, Chile; Prof. Dr. Ir. F. K. Th. Van Iterson, vice president, State Collieries, Heerlen (Limburg), Holland; Dr. Constantin Motas and wife, Dir. Gen. de Las "Societe Nationale de Caz Methane," Roumania; Harry R. Cook, superintendent, Gas Operating Department, Con. Gas. Elec. Lt. & Pr. Co., Lexington Building, Baltimore, Md.; Kendall Foss, U. S. A. (Tour Secty.); H. C. Porter, U. S. A. (Tour Secty.); G. Palm (American Express tour conductor).

● THE KENNECOTT COPPER CORPORATION and subsidiaries report for the six months ending June 30, 1936, a net profit of \$9,097,891 after depreciation, Federal income taxes, minority interest, etc., but before depletion, equal to 84 cents a share on 10,773,485 shares. No provision was made for Federal surtaxes on undistributed profits. This compares with \$3,418,097, or 32 cents a share, in the first half of 1935.

● NATIONAL COAL ASSOCIATION is sponsoring a broad educational program designed to better acquaint the public with the coal industry and its problems. Cooperating with the Association in its efforts will be the Bituminous Coal Research, Inc., and the committee of 10. The program it is anticipated will be directed to home owners and to architects, engineers and contractors responsible for the designing of homes and buildings.

● BULLETIN 11, "The Geology of the Organ Mountains, with an Account of the Geology and Mineral Resources of Dona Ana County, New Mexico," by Kingsley C. Dunham, has been released by the New Mexico Bureau of Mines.

● J. V. CLAYPOOL, Hibbing, Minn., district superintendent for the Oliver Iron Mining Company, told the National Safety Congress that "scientific ears, mechanical thermometers and giant stethoscopes" would "feel the pulse" of Mother Earth in the future and warn of impending cave-ins. "Controlling falls of ground in underground mines," he said, "is rapidly becoming an absolute science and not simply a matter of trusting the eyesight and hearing of miners. In the past miners had to wait until the ground 'talked to them,' as they call it, before they were aware that the earth was settling or shifting above them. The ground 'talked' with trickles of dirt from the back (ceiling or walls of the mine, or timber supports began to groan, bend or splinter under increased pressure of settling earth. Several devices, some of them in use, have been perfected that hear and record this language of the earth when it is only the faintest whisper.

"The Germans have built what they call a dynamometer prop that records pressure in much the same manner as a thermometer records temperature. The device is built into one of the supports that is wedged against the floor and ceiling. The slightest increase in pressure on the support is recorded by the rise of a mercury column in a graduated receptacle. Another device utilized a steel bar, fitted telescopically into a cylinder and held in place by a stout coil spring. When it is set against mine ceilings and floors, compression of the spring is registered by a stylus that traces a line on a recording drum that is actuated by clockwork.

"Research is still developing a third device for reading ground conditions that employs the principle of the physician's stethoscope and an amplifying unit that would 'step up' any slight sound caused by movement of ground above the mine ceiling."

● JOHN M. LOVEJOY, president, and A. B. Parsons, secretary, of the American Institute of Mining Engineers, arrived at Mullan in the Coeur d'Alenes, September 17, coming from Salt Lake. They were entertained there at an evening dinner at the Morning mine boarding house, with about 75 mining engineers of the Coeur d'Alenes present. The next morning they inspected the extensive surface workings of the Sunshine mine, near Kellogg, then went to Spokane for lunch. In the afternoon they drove to Trail, B. C., where they inspected the plants of the Consolidated Mining and Smelting Company of Canada.

They returned to Spokane for a dinner, given them by Columbia section of the American Institute of Mining and

Metallurgical Engineers, September 19. From Spokane they went on to the coast, stopping to inspect the Grand Coulee Dam construction in the Columbia River. From Seattle they went on down the coast.

● **THE HECLA MINING COMPANY**, in the Coeur d'Alenes, appears to have been justified in delaying construction of the mill which it announced it will build to treat the ores of the Polaris property, which it controls and is developing. Before starting mill construction it has undertaken a campaign of development beyond what it apparently originally planned before building.

This delay is not because the deep level ores of the Polaris proved disappointing either in size or value. On the contrary, the ores and values are equal to the company's highest expectations. So much so, the Hecla Company decided to pursue the exploration, and already is rewarded with what are unofficially described as two important strikes.

Tied in with the Hecla's Polaris holdings is the Chester property, and in deepening the Polaris three-compartment shaft a strike has been made between the 1,200 and 1,300 ft. levels and approximately 200 ft. below what is known as the Silver Summit level. A foot of rich silver ore is reported here.

At about the same time a vein said to be 20 ft. wide has been intersected in Polaris ground on the 1,040-ft. level. The filling is entirely of vein matter, with stringers of good ore from an inch to 6 in. wide. Selected samples are said to have run as high as 600 ozs. in silver. The ore is of the Sunshine character, without lead.

These two strikes in the Polaris workings have further stimulated the 20 or more other companies which hold properties in the silver belt of the Coeur d'Alenes.

● **DURING** the week of September 7, the Cambria County Fair was held at Ebensburg, Pa., and very interesting exhibits of mining machinery and equipment were visited by a large number of coal operators.

On Wednesday, September 9, the manufacturers of mining equipment held an Exhibitors' Party at the Sunnyside Country Club, near Johnstown, to which the representatives of coal companies were invited. In the afternoon a handicap golf tournament was participated in by 85 men, and an informal dinner that night was attended by 174 coal operators, representing 72 coal companies in Pennsylvania and northern West Virginia. A number of valuable prizes were awarded to the winners in the golf tournament. Maj. Daniel J. Shields, of Johnstown, welcomed the guests at the dinner with a short talk.

The exhibitors who sponsored the party were as follows:

American Car & Foundry Co.; Bethlehem Steel Co.; the Brown-Fayro Co.; Carnegie-Illinois Steel Corp.; Flood City Brass & Electric Co.; General Electric Co.; General Explosives Dept., American

C. & C. Corp.; Goodman Manufacturing Co.; J. Guy Griffith Co.; Gulf Refining Co.; Johnstown Office Supply Co.; Irwin Car & Foundry Co.; Jeffrey Manufacturing Co.; LaDel Conveyor Co.; Mine Safety Appliance Co.; New Departure Manufacturing Co.; Ohio Brass Co.; Penn Machine Co.; Post Glover Electric Co.; Roberts & Schaefer Co.; Sun Oil Co.; Swank Hardware Co.; Sweets Steel Co.; the Thackray Co.; Timken Roller Bearing Co.; Tyson Roller Bearing Co.; United Engineering & Constructors; Universal Electric Co.; Westinghouse Electric Company; J. W. Walters Co.; A. Wychoff & Son Co.

● **IN CONNECTION** with the expiration of the emergency surcharges on December 31, 1936, the carriers of the country, through the Association of American Railroads, presented the shippers with proposals of rate revisions. The shippers were represented by the National Industrial Traffic League. Also present were representatives of the Anthracite Institute and the National Coal Association. While the proposals are not complete, there being under way several studies as to the future status of several commodity rates not yet reported, it was indicated that one of the purposes of the revisions was to insure the carriers of a continuing revenue after the expiration of the emergency charges.

The more important changes affecting anthracite are as follows:

SCALE NO. 1

Where the rate per ton is up to 75 cents the increase to be 3 cents per net ton and 3 cents per gross ton.

Where the rate per ton is 76 cents to \$1, the increase to be 5 cents per net ton and 6 cents per gross ton.

Where the rate per ton is over \$1, the increase to be 10 cents per net ton and 11 cents per gross ton.

With the following qualifications:

1. Except as indicated below, rates within and to the West to be increased on the following scale (proposals relating to bituminous omitted): Where the rate per ton is "Over \$2, the increase to be 15 cents per net ton."

Exceptions:

(a) Will not apply in the instance of rates on coal to Milwaukee, Racine, Kenosha, Wis.; Waukegan, North Chicago, Ill.; and intermediate points to which Scale No. 1 will apply.

2. Rates established to meet truck and/or water competition and so indicated in the tariffs, where emergency charges are not now applied, need not be increased.

3. Rates on unprepared anthracite moving to breakers for preparation and reshipment by rail will not be increased.

5. Rates on coal from Lake Superior and Lake Michigan docks to the interior to be increased as per Scale No. 1.

Lake Cargo Coal: Efforts are to be made to effect some arrangement with

the consent of the Interstate Commerce Commission, under which on lake cargo coal having a revenue road haul by rail beyond docks at Lake Michigan and Lake Superior ports, a single increase of 15 cents per ton shall be applied to the combined revenue of the rail lines—from the western ports.

Tidewater Coal: Rates on Tidewater coal moving to the Eastern ports of transshipment to be increased 11 cents per gross ton. Efforts are to be made to effect some arrangement, with the consent of the Interstate Commerce Commission, under which tidewater coal moved by rail from docks at the New England ports to destinations in the six New England states, will be subjected to a single increase of 11 cents per gross ton.

It is expected that shipping interests will oppose, in part at least, the proposals of the carriers.—(*Bulletin, Anthracite Institute.*)

● **THE AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS** have concluded three fall meetings and have scheduled four more. The Industrial Minerals Division met at State College, Pennsylvania, September 24-26, the Petroleum Division at Los Angeles, October 1 and 3, and the Petroleum Division at Fort Worth, October 8 and 9.

The other meetings scheduled include: Institute of Metals Division, Cleveland, October 20-22; Iron and Steel Division, Cleveland, October 20 and 22; and the Coal Division, Pittsburgh, October 21 and 22. Annual meeting of the Institute will be held in Mexico City, November 9 to 15, inclusive.

● **IT IS** recently announced that John Laing and A. W. Laing have purchased 1,929 acres of coal land from the Beckley Fire Creek Coal Company, where operations will be started at once.

● **THE QUINCY MINING COMPANY**, one of the important copper producers of the Upper Peninsula of Michigan, went into production in September after a shutdown since September 22, 1931.

● **STEEL OPERATIONS** in the Pittsburgh District are operating at approximately 77 percent of capacity.

● **A MOVE** to revise its employees' representation plan, under which more than 80,000 Carnegie-Illinois Steel Corporation employees operate, has been proposed. The major change in the representation plan is in the creation of a small bargaining committee, which would be called the Pittsburgh District General Council, and would consist of two employee representatives from each Carnegie-Illinois plant. It would be unlike the present Central Committee in that it would be recognized by the management and would have unusual power in negotiating on wages and other vital issues.

● **FOUR LARGE** copper companies in the state of Arizona increased their wage scale 5 percent on September 1. This decision affects approximately 2,500 men. The companies involved are Inspiration Copper Company, Phelps Dodge Corporation, Miami Copper Company and Shattuck-Den.

● **THE ARTHUR MILL**, at Garfield, Utah, property of the Utah Copper Company, resumed operation on September 1 after a shutdown since January, 1930. The mill will operate at one-third capacity. Wages will be increased 5 percent at both the mine and mills of this company, and will affect some 2,300 men; 250 additional men have been added to the pay roll.

● **THE CLIMAX MOLYBDENUM COMPANY**, at Climax, Colo., has inaugurated an extensive exploration program, with six diamond drills working 16 hours daily.

● **PRESIDENT ROOSEVELT** indicated he may ask Congress to enact legislation giving him "emergency" authority over gold content of the dollar, adding that such authority would be used only if foreign currency manipulations tended to break down the American price level.

● **THE** annual meeting of the Copper and Brass Research Association was held at the offices, 420 Lexington Avenue, New York City, on October 15. Officers were elected and a budget and program for the ensuing year approved. The organization is composed of fabricators of copper and its alloys representing 85 percent of the entire industry.

● **THE** electric welding section of the National Electrical Manufacturers Association has established development headquarters in the Frick Building, Pittsburgh, Pa.

● **THE** name of Koppers Gas & Coke Company, Pittsburgh, Pa., has been changed to Koppers Company, the company has announced.

Three subsidiary companies have been or will be dissolved and will become divisions of the parent company. They are: The Koppers Construction Company, which becomes the Engineering and Construction Division; Koppers Products Company, which becomes the Tar and Chemical Division, and The Bartlett Hayward Company, which becomes the Bartlett Hayward Division.

The Western Gas Division of The Koppers Construction Company becomes a division of Koppers Company as does the American Hammered Piston Ring Division of The Bartlett Hayward Company.

The Maryland Drydock Company, The White Tar Company of New Jersey, Inc.,



South Slope of Bull Hill, Cripple Creek, Colo.

and The Wood Preserving Corporation remain as subsidiaries of Koppers Company.

Officers of the former subsidiaries will become officers of Koppers Company.

To avoid similarity of titles, the name of The Koppers Company, parent company of Koppers Company, will be changed to Koppers United Company.

Activities of Koppers Company, through its subsidiaries and divisions, include the designing, construction and operation of by-product coke plants, gas producers, tanks, holders and other gas apparatus, wood preserving plants, and dry docks, and the production and sale of motor benzol, ammonium sulphate, naphthalene, phenol, Tarmac road materials, roofing products, tar acid oils, pitch and other coal tar products, machinery and steel mill equipment, piston rings and packing.

It is understood that a refunding of Koppers Company's bonds is contemplated as a further step in the reorganization program.

● **THE** State Bureau of Mines and Mineral Resources of the New Mexico School of Mines, at Socorro, has just issued a revised edition of the "Oil and Gas Map of New Mexico," which is included in Bulletin 9 of the bureau, "The Oil and Gas Resources of New Mexico," by Dean E. Winchester. The map has been revised by A. Andreas to July 15, 1936.

According to E. H. Wells, director of the bureau, the map shows the axes of nearly 200 anticlinal structures, and the location, total depth and results (by symbol) of approximately 1,200 wildcat wells. Known oil and gas fields are in-

dicated, and the location of main oil and gas pipe lines, refineries and natural gasoline plants are shown. Areas where carbon dioxide gas occurs are indicated. The map is printed in one color, with a scale of 1 to 1,000,000, or approximately 1 inch to 16 miles.

The price of the new map printed on paper is 75c, and \$1.25 mounted on cloth.

● **MONTANA** has entered a large exhibit in the Metal Products Exhibits Exposition, now being held in the International Building, Rockefeller Center, New York City, and which terminated on October 17. The exhibit consisted of 18 maps covering the various mineral resources in this state and 11 charts covering production of the various metals. This was supplemented by several hundred photographs, showing practically the complete mineral industry in Montana. The exhibit was compiled by Dr. Francis A. Thomson, president of the Butte School of Mines, and F. C. Gilbert, secretary of the Mining Association of Montana.

● **FAIRVIEW GOLD MINES, INC.**, six and one-half miles northeast of Sheridan, Madison County, which shipped \$30,000 of ore from developments last year, has driven a tunnel into the mountain for a length of over 1,000 ft. and is close to the point of tapping a vein which measures 35 ft. in width at the surface.

● **JAMES F. McCARTHY**, president of the Hecla Company of Kellogg, Idaho, announces that his company will start construction of a 750-ton mill to treat the ore from the Star mine at Burke, Idaho.

● **THE WEST VIRGINIA COAL MINING INSTITUTE** held its twenty-ninth annual meeting at Logan, W. Va., September 25 and 26. E. B. Agee is president of the Institute, and J. W. Cooley is secretary.

● **THE PAGE POCAHONTAS COAL COMPANY** recently opened the Page Smokeless mine, located in Buchanan County, Va. Potential daily capacity of the mine is 4,500 tons. The plant, which consists of a five-track all-steel tippie, reassembling plant and crushing plant, was engineered and built by the Jeffrey Manufacturing Company, of Columbus, Ohio.

● **THE WILL** of E. J. Berwind, late chairman of the board of the Berwind-White Coal Mining Company, disposed of an estate estimated at \$60,000,000. The will provided for keeping the coal properties owned by the company intact, saying "that they shall continue to hold said shares and coal and other properties represented thereby, not only for the reason that the greater portion of my active business life has been devoted to assembling coal properties, but also because I believe it to be greatly in the interest of the communities affected by the properties, as well as in the public interest, that these properties shall be kept together and not disassociated one from the other. I earnestly desire my executors and trustees and those who follow me in the management and operation of these properties to such an extent that they will carry out my wishes in this regard and thereby discharge an important service to the public as well as to the family." Charles E. Dunlap, a nephew of Mr. Berwind's, and president of the Berwind-White Company, received a legacy of \$50,000 and a life interest in one-third of the residuary trust.

● **THE LAKE SUPERIOR MINING INSTITUTE** held its 1936 annual meeting on the Marquette Range on August 28 and 29.

● **THE VALUE** of gold, silver, copper, lead, and zinc from mines in Utah in 1935 was \$31,676,748, compared with \$22,975,534 in 1934, or an increase of nearly 40 percent. The feature of the mining industry in 1935 was the marked increase in quantity and value of all five metals. The Utah Copper Company was by far the largest producer of gold in Utah in 1935, and it was followed by the United States group at Bingham, the Eureka Standard mine near Eureka, the Lewiston Peak mine at Mercur, and the Mammoth mine near Eureka. These five mines produced nearly 69 percent of the state output of gold in 1935.

There was an increase of nearly 30



Prize Winners in Rock Drilling Contest.

Upper—Fred Dopp.

Center—Arch Walker and Ed Saunders.

Lower—Clyde and Bill Coughlin.



percent in the production of silver in 1935. The largest producer of silver was the United States group at Bingham. It was followed by the Tintic Standard mine at Dividend, the Silver King Coalition mine at Park City, the Park City Consolidated mine near Park City, and the Utah Copper mine at Bingham. Compared with other states, Utah ranked third in silver production in 1935, after Idaho and Montana. Notable increases were reported from the United States group and the Park City Consolidated, Tintic Standard, and Utah Copper mines.

The output of copper increased more than 50 percent, due largely to increased output at the Utah Copper mine at Bingham. Other producers of copper were the United States group, Boston Consolidated, and Utah-Delaware mines. The output of recoverable lead increased more than 9 percent, compared with 1934, and came chiefly from the West Mountain (Bingham) district. The largest producers of lead in Utah in 1935 were the United States group at Bingham and the Silver King Coalition mine at Park City. The output of recoverable zinc in Utah in 1935 increased more than 10 percent. There was an increase in zinc from lead-zinc ore of the West Mountain (Bingham) district and from



the Park City region. The output of ore, chiefly copper ore, increased 53 percent in 1935, and the number of producing mines was increased 8 percent.—U. S. Bureau of Mines.

● **REPORTS** for the month of August, 1936, from state mine inspectors to the United States Bureau of Mines, show that 107 men lost their lives from accidents in and about the coal mines of the

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FRED DOPP, of Jamestown, Colo., 55, and graying at the temples, won \$200 first prize in the single-hand contest of the rock-drilling feature of the Western Division, American Mining Congress, Denver Convention. His hole, 13½ in. deep in a solid block of hard granite, drilled by hand in 10 minutes, was more than 2 in. deeper than the next best performer.

A Boulder, Colo., team, Mickie and George Coughlin, cousins, who for years have dominated the double-hand contests, again placed first and walked off with \$350 prize money.

Close after them, however, was another Boulder team, composed of Arch Walker and Ed Saunders. Their hole of 23½ in. was only five-sixteenths of an inch less than that of the perennial champions. It won them \$200.

Two brothers, A. F. and E. J. Eccker, of Blackhawk, Colo., placed third. Their "pay dirt" amounted to \$100.

The men, using 8-lb. sledges, alternated pounding and holding the bits every half-minute for 10 minutes.

"Short 3 in. of what it should have been," was Dopp's comment as A. E. Byron, a Boulder mining engineer, measured his hole. "Either this rock is awful hard or else I'm weakening."

Dopp's best performance is 18½ in., made several years ago.

A. F. Eccker, who with his brother placed third in the doubles, was second in the singles. His hole measured 11 3/16.

Arch Walker, second place winner in the doubles, was third in the singles. Walker, Dopp's understudy, was rated for second place by experts, but dropped to third when a bit broke. Several mining men said that Walker would have dethroned Dopp, beaten only once in his long career, if his bit hadn't broken.

Eccker's performance in the singles netted him \$100, boosting his total "take" to \$150 for the day. Walker was awarded \$50 in the singles, making his total for the day also \$150.

Then Clyde and Bill Coughlin demonstrated that Colorado mining camps are still producing real hard-rock "men."

Clyde is 9. Bill is 6. They are third generation hardrock men. Sons of Mickie, their grandfather was a champion in the doublehand contests for 20 years.

They staged a demonstration of what it is possible for youngsters to do with the three-pound hammer instead of the 8-lb. size the men swing.

They also proved that it takes fortitude, as well as muscle and endurance, to send the steel drills biting into the rock.

As Clyde was changing his bits and Bill swinging, the piece of steel in the drill hole flew up and struck Bill in the mouth. The blow bruised and hurt—hurt bad.

It brought tears to Bill's eyes and a grimace of pain to his mouth. But he kept swinging manfully, blinking away his tears to keep his sight on the drill head.

And in seven minutes the two youngsters sunk a hole four and one-half inches deep in the resistant granite.

—As reported by the Denver Post.

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United States. The fatalities occurred in the mining of 36,041,000 short tons of coal, the death rate being 2.97 per million tons. Corresponding reports for August last year show that 83 men lost their lives in mining 28,755,000 short tons, the death rate being 2.89 per million tons.

Bituminous mines reported 85 fatalities during August, the production of coal being 32,818,000 short tons and the death rate 2.59 per million tons. Revised figures for July show 69 fatalities, a production of 32,054,000 tons and a rate of 2.15. The August and July rates

were better than the corresponding rates a year ago.

The anthracite mines of Pennsylvania reported 22 fatalities in the mining and preparation of 3,223,000 short tons of coal, giving a death rate of 6.83 per million tons. Revised figures for July show a total of 13 fatalities, a production of 3,666,000 tons, and a death rate of 3.55. These revised figures show a considerable increase in the fatality rate from that published last month but the increase was due chiefly to a revision of the tonnage figure. The rate for August a year ago was considerably better than the current month's rate.

Death rates in this report are based on tonnage rather than on number of men employed as the latter item is not reported monthly to the Bureau of Mines. All rates and other figures for current year are subject to revision.—(U. S. Bureau of Mines Bulletins.)

● OF INTEREST to all concerned with research in the coal industry are certain announcements made at the recent meeting of the American Chemical Society in New York when Dr. H. R. Dittmar, of the duPont corporation, exhibited a new kind of glass which had been manufactured from coal and air. The product is promised to displace ordinary glass and plastics in uses which require lightness and strength. In exhibiting this glass before the Society, pieces, such as drinking glasses and long rods, made from this substance which is technically called "pontalite," were dropped to a concrete floor; none of them broke. It is claimed that this composition is unharmed by long exposure to the sun. The material can be sawed, drilled, polished and molded to any desired form. Dr. T. E. Warren, of Ottawa, Canada, in speaking of the development of oil and gas from coal, said that the world's known supply of petroleum is only about 10 years. It seems the authorities on this subject are getting a little closer together, as it was recently said by officials of the Bureau of Mines that the supply would perhaps last another 15 years.—*National Coal Association Bulletin*.

● PEND OREILLE MINES AND METALS COMPANY has applied to the Federal Power Commission at Washington for a permit to develop 2,000 hp. at Metaline Falls, in the Pend Oreille River. Lewis P. Larsen, president and manager of the company, on his return to Spokane from Washington, reported that when he presented his application at Washington it was received without objection. The application is then advertised two weeks, after which 30 days elapse to give time for the filing of objections. This is expected to bring the application up for final hearing early in November. So far as known, no one has indicated any intention of opposing the grant.

Hugh Cooper has had a permit for 20 years to develop a large power plant at Z Canyon, a few miles below Metaline Falls. He has not indicated when he will proceed with that enterprise, on which he has spent a good deal of money in exploration. It is said the power which the Pend Oreille Company would develop would not interfere with the Cooper project.

The Pend Oreille Company is handicapped for power. It is doubling the capacity of its mill to about 600 tons a day. The entire Metaline district is in need of power. The American Zinc Company has a large development program under way for the Metaline Mining and Leasing Company's property, and is using Diesel power in driving a long tunnel.

● **BITTER-ROOT-BUTTE MINING COMPANY**, of Hamilton, Mont., of which Joseph A. Farrow, of Butte, is the leading spirit, is working the Minnie Jane claim in the western part of Butte, and shipping silver ores.

● **SYLVAN GOLD MINES, INC.**, has been formed to work the Deer Creek properties of August Freeburg, near Basin. Officers include W. H. Myers, O. A. Bittrock, and H. H. Phipps, all of Spokane.

● **SOME** of the craft unions, employed by the Anaconda Copper Mining Company, in Montana, have voted to accept a 50 cents per day raise on a two-year contract beginning September 20, 1936. This is based on 9¼-cent copper, with an advance of 25 cents per day when copper touched 11½ cents per pound and a further 25 cents per day advance with one and one-half advance in copper above 11½ cents.

—Personals—

Louis S. Cates, president of the Phelps Dodge Corporation, has returned to New York after an extended European trip.

Scott Turner, former director of the United States Bureau of Mines, has moved his New York office to 29 Broadway.

Cadwallader Evans, Jr., general manager of the Hudson Coal Company, has returned to his home in Trenton, N. J., after a European vacation.

Eugene McAuliffe, president of the Union Pacific Coal Company, was in Washington in September. In addition to being a director of the American Mining Congress, he is chairman of the coal section of the A. I. M. E.

Dr. Kuo C. Li, president of the Wah Chang Trading Corporation of New York, has returned to this country after a European trip. Dr. Li was scheduled to address the annual meeting of the Western Division, American Mining Congress, but his European trip prevented his doing so.

J. R. Finlay has been in Europe for several weeks.

Dr. H. Foster Bain has returned to New York after attending the conference of the Institute of Pacific Relations, recently held at Yosemite Park.

Lucien Eaton, consulting mining engineer, is again at his home at Milton, Mass., after a western trip.



Paul Weir

Paul Weir, for the past eight years vice president in charge of production, Bell & Zoller Coal Co., is retiring from active participation in the operations of the Bell & Zoller mines on December 31, 1936. After that date he will engage in consulting engineering work, specializing in modernization and management of coal mines, and will continue with Bell & Zoller in that capacity. W. P. Young, now general superintendent of the Peoria property and formerly superintendent of the Zeigler property, will succeed Mr. Weir.

R. Dawson Hall, of McGraw-Hill Publishing Co., Inc., who has been seriously ill, is recuperating satisfactorily.

Edward L. Sweeney, consulting engineer, Denver, Colo., is in Australia building a mill for the American Smelting and Refining Company.

Robert Linton, consulting engineer of Los Angeles, was recently appointed a member of the California State Mining Board.

Dr. Otto Sussman has been elected a member of the board of the Roan Antelope Copper Mines.

Donald B. Gillies, Cleveland, Ohio, vice president of the Republic Steel Corporation, is again in Cleveland after spending several weeks vacation in northern Minnesota.

Guy N. Bjorge, succeeds the late B. C. Yates as manager of the Homestake Mining Company. Mr. Bjorge with Mrs. Bjorge attended the Western Division meeting at Denver. Before joining the Homestake staff two years ago, he was consulting geologist with offices in San Francisco and several years ago was associate editor of THE MINING CONGRESS JOURNAL.



Jas. R. Hobbins

Cornelius F. Kelley, president, and **James R. Hobbins**, vice president, of the Anaconda Copper Mining Company, after spending part of the summer at their lodges near Flathead Lake, Mont., have returned to their headquarters in New York City.

R. L. Ireland, Jr., vice president of the Hanna Coal Company, addressed the American Bituminous Retail Coal Merchants Association on the "High and Low Roads," at their recent annual convention.

John T. Ryan and **Mrs. Ryan**, Mine Safety Appliances Company, have returned to their home in Pittsburgh after an extended Western trip. With them was Mr. Ryan's son, **John T. Ryan, Jr.**, who is still in the West in the interests of the company. All three attended the Western meeting of the American Mining Congress the latter part of September.

Among those who attended the Western Division meeting from the iron ore ranges were **Mr. and Mrs. Geo. C. Shallenberger**, St. Paul, Minn.; **Mr. and Mrs. H. L. Pierce** and **R. C. Allen**, of Cleveland, Ohio; and **Carl Zapffe**, Brainerd, Minn.

George Otis Smith has been appointed a special representative of the Board of Directors of the American Institute of Mining & Metallurgical Engineers and will visit many of the local sections.

Harry C. McAllister, of Spokane and Wallace, Idaho, well-known mining broker, recently spent a week in western Montana inspecting mining properties.

Henry B. Van Sinderen has been named president of the Callahan Zinc-Lead Company by the new board of directors, succeeding **Donald A. Callahan**, of Wallace, Idaho. Members of the new board of directors are **Dr. Max T. Smith**, vice president; **Frank Eichelberger**, general manager; **Joseph T. Hall**, secretary-treasurer; **Hamilton Baker**, **Prentice D. Ash**, **Charles Finucane**, and **W. M. Yeaman**.

Frank Ayer, formerly connected with the Phelps Dodge Corporation in Arizona, who is now general manager of the Roan Antelope Copper Mines, Ltd., recently spent a vacation in the United States but has now returned to his post in northern Rhodesia.

F. E. Berquist, United States Bureau of Mines, has been on a nation-wide tour sponsored by the Third World Power Conference.

Howard N. Eavenson, Pittsburgh, Pa., spoke before the annual banquet of the West Virginia Coal Mining Institute, September 25.

Mr. and Mrs. Herbert Wilson Smith, of the Union Carbon and Carbide Corp., have returned from a western trip which included the convention of the American Mining Congress and a trip to Santa Fe, N. Mex.

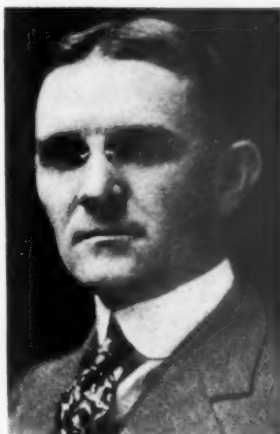
Oscar N. Friendly has been elected chairman of the Board of Governors of the Western Division of the American Mining Congress.

Philip D. Wilson, vice president of the Partners Mines Corporation of New York, sailed on September 13 for England.

F. C. van Deinse, of the Yuba Gold Dredging Company of California, is in England.

H. C. Bacorn has resigned as general manager of the Jardine Mining Company of Montana.

J. D. Francis, president of the Island Creek Coal Company, who recently returned from Europe, addressed the American Bituminous Retail Coal Merchants Association on "Trends in Coal."



J. D. Francis



Erskine Ramsay

Erskine Ramsay, of Birmingham, Ala., who is to receive the William Saunders Medal from the American Institute of Mining and Metallurgical Engineers, represented his state at the Western Division meeting of the American Mining Congress at Denver, Colo., the week of September 28.

Appointment of Stanly A. Easton, Kellogg, president of the Bunker Hill and Sullivan Mining and Concentrating Company, as a member of the Idaho unemployment insurance board was announced September 17. Easton is one of three members to be appointed on the advisory board, which will assist the state industrial accident board in the administration of the new unemployment insurance act. He will represent employers.

William P. Yant, well known to American industry as the chief chemist in the Health Division of the United States Bureau of Mines, became director of research of Mine Safety Appliances Company, with whose activities as one of the world's largest manufacturer of approved safety equipment, his own work at the Bureau of Mines for years has been closely associated. His investigations and developments there for the betterment of working conditions in various industries have won him national recognition as one of the men chiefly responsible for the great progress in industrial safety.

At a meeting of the Board of Directors of the Westinghouse Electric and Manufacturing Company, George H. Bucher was elected executive vice president of the company with headquarters at Pittsburgh, Pa. Mr. Bucher is also president and general manager of the Westinghouse Electric International Company.

A. W. Dickinson, the American Mining Congress, attended the meeting of the Lake Superior Mining Institute at Ishpeming, Mich.

Albert Knorp was recently elected secretary of the newly formed Gold Producers of California, with headquarters in San Francisco.

—Died—

The death of Axel P. Ramstedt, 61, a resident of Wallace, Idaho, for many years and prominent in affairs of district and state, occurred October 6. He was vice president and manager of the Wallace Bank and Trust Company and connected with a number of mining corporations in an official capacity.

Mr. Ramstedt was recognized as an authority on taxation matters and particularly were his services in demand in connection with mine taxation, both in Idaho and in the nation's capital where he was frequently called in consultation. He was a member of the



Executive Tax Committee of the American Mining Congress and a member of the American Institute of Mining and Metallurgical Engineers.

During his active career in Idaho he served as a member of the state public utilities commission and was state tax commissioner in 1912 and 1913.

He wrote a number of outstanding articles on tax matters which appeared in some of the nation's leading mining journals.—(From Wallace Press-Times.)

Edward Johnson, head of the Lorain Coal and Dock Company, died at his home in Columbus, Ohio, September 24. Mr. Johnson was a pioneer in the bituminous coal industry. Mr. Johnson is the father of Stanley B. Johnson, president of the Lorain Coal and Dock Company.

Charles G. Hall, vice president and general manager of the Walter Bledsoe Coal Company of Indiana, with his son Jack, 17 years old, was killed in an automobile accident on September 14. Mr. Hall and his son were returning from a vacation trip. He had long been a leader in the Indiana coal fields and his loss will be severely felt.

The Manufacturers Viewpoint

● **ALLIS-CHALMERS MFG. COMPANY**, Milwaukee, Wis., has just issued a new Bulletin 1479 on their style B centrifugal vibrating screens used for washing, dewatering and sizing nearly all materials pertaining to the crushing, mining and processing industries. A useful dimension table for single, double and triple deck style B screens is included, giving screen sizes with motor sizes and approximate weights of each.

● **THE GARDNER-DENVER COMPANY** announces its new R-111 and R-91 self-rotated stopers which, according to company officials, embody the latest and most advanced features of stoper design. Definite assurance of more footage per shift was the object sought in designing the new drills, the company states. To this end, the R-111 stoper utilizes proven pawl rotation, effective check cleaning by exhaust air without reducing effective chuck length, and the type of tubular valve. Used on its drifting and sinking drills, the new stoper has the ease of handling, economical operation and freedom from maintenance expense which have characterized previous Gardner-Denver stoper models. The R-91 stoper is a lighter drill for use where rock conditions are less severe, but with all the advantages of the R-111 stoper.

● **A NEW DRILL** for a multitude of jobs is the "JA-30 Jackhammer," recently introduced by Ingersoll-Rand. It is already in wide use in place of heavier drills for light rock drilling, such as blockholing, trimming, scaling, holes for conduits, pipes, railings, foundation bolts, maintenance and demolition work. It is stated that the new Jackhammer is a very fast driller and uses but a small amount of air. New Bulletin No. 2254 shows the JA-30 "Jackhammer" and gives a number of views of the drill in operation on representative jobs. A copy may be had from Ingersoll-Rand Company, 11 Broadway, New York, N. Y.

● **A BULLETIN** describing their new Improved M. S. A. Methane Detector has just been issued by the Mine Safety Appliances Company of Pittsburgh, Pa. The instrument detects the presence of small quantities of methane content in mine air and accurately indicates the exact concentration. It was originally developed to meet the demand of progressive coal mining engineers and inspectors for a more exact knowledge of the methane content in mine air than is possible with Flame Safety Lamps. It employs the same operating principle, but the design

is refined and simplified, making the new instrument smaller, lighter and more stable in operation, with even greater assurance of long service life, consistent accuracy and inexpensive maintenance. The improved M. S. A. Type W-18 Methane Detector, like the original unit, is officially approved by the U. S. Bureau of Mines. Copies of this descriptive booklet are available either through this magazine or by addressing the manufacturer direct.

● **Atlas Powder Company** has issued a new Atlas Catalog, in which are described briefly the many different kinds of Atlas Explosives available to users. Several products exclusive with Atlas, which have been widely accepted by industry are included. For instance, the Accordion Fold Electric Detonator package, Apex, the Twin-Fifty Blasting Machine, Blakstix, and others. While this catalog is not intended as a hand-book on the use of explosives, over 100 different grades of dynamites and a wide variety of accessories are listed which will aid the user in choosing the supplies and explosives best suited to his job.

● **"SINTINEL,"** a new, lightweight Cool Hat, affording head protection to coal and metal miners, is now being offered to the trade by the Portable Lamp



& Equipment Co., Pittsburgh, Pa. The manufacturers will gladly furnish literature and further details on request.

● **THE LINDE AIR PRODUCTS COMPANY**, unit of Union Carbide and Carbon Corporation, on October 5 opened a new district office at 2 Virginia Street, Charleston, W. Va. A. R. O'Neal has been appointed district manager.

● **SULLIVAN MACHINERY CO.** has developed a new single-stage steam-driven horizontal compressor—Class WA-7—for steam pressures 80 to 250 lb., air pressures up to 150 lb., sizes 279 to 1987 CFM.

The WA-7 is a heavy-duty single-cylinder double-acting unit for either air or gas compression. The steam cylinder is placed in tandem with the air cylinder next to the frame, and is heavily

lagged for steam economy. The steam valve is of the balanced-piston type, with inlet pressure in the middle so that the valve rod box is sealed against exhaust pressure only. A variety of controls is available to provide greatest economy under each operating condition: throttling flyball governor for steady steam and air pressure; flywheel governor for variable steam with steady air pressure, etc. Timken double row main bearings, force-feed lubrication, special cast-alloy air-cylinder liner and valves with laminated cushion backs are features which add to efficiency.

For more complete data, ask for Bulletin A-14, Sullivan Machinery Company, Michigan City, Ind.

● **A NEW**, 24-page bulletin, WP-1061, showing their equipment for contractors, is offered by Worthington Pump and Machinery Corporation, Harrison, N. J. This bulletin shows power, compressed air, drilling, pumping, and miscellaneous equipment on the job and in the shop.

● **FOR** driving general purpose machinery in industrial plants and auxiliary equipment in generating stations and on shipboard, a new and improved line of Type "C" turbines is announced by Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa. The turbines are of the impulse type, having one pressure and two velocity stages.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

OF THE MINING CONGRESS JOURNAL, published monthly at Washington, D. C., for October 1, 1936.

City of Washington,
District of Columbia, ss:

Before me, a notary public in and for the state and county aforesaid, personally appeared B. E. Chambers, who, having been duly sworn according to law, deposes and says that she is the business manager of THE MINING CONGRESS JOURNAL, and that the following is, to the best of her knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in Section 411, Postal Laws and Regulations, printed on the reverse side of this form, to-wit:

1. That the names and addresses of the publisher, editor, and business manager are:

Name of publisher, The American Mining Congress, Washington, D. C.

Editor, E. R. Coombes, Washington, D. C.

Business manager, B. E. Chambers, Washington, D. C.

2. That the owners are: The American Mining Congress—a corporation, not for profit. No stockholders. President, Howard I. Young, St. Louis, Mo. Secretary, Julian D. Conover, Washington, D. C.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: None.

B. E. CHAMBERS,
Business Manager.

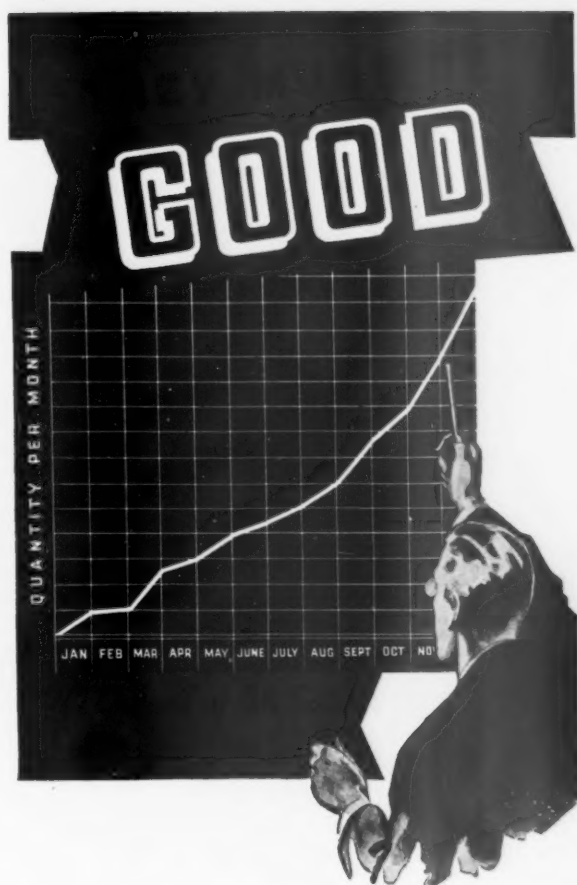
Sworn to and subscribed before me this 9th day of October, 1936.

[SEAL]

ELSIE L. LEISHEAR,

Notary Public.

(My commission expires January 31, 1939.)



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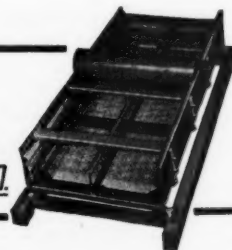
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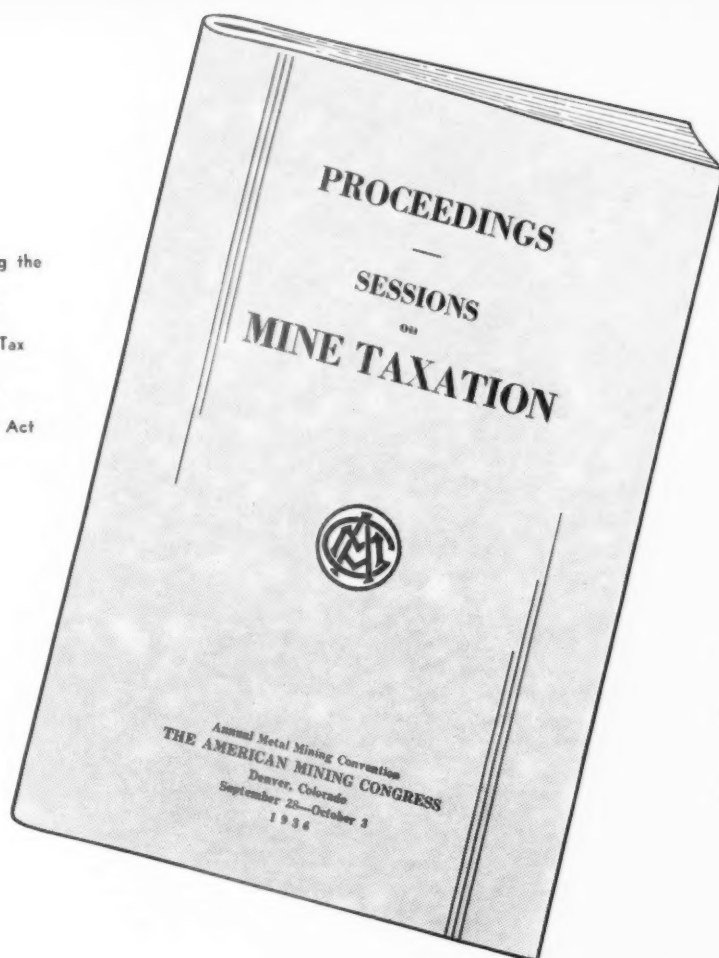
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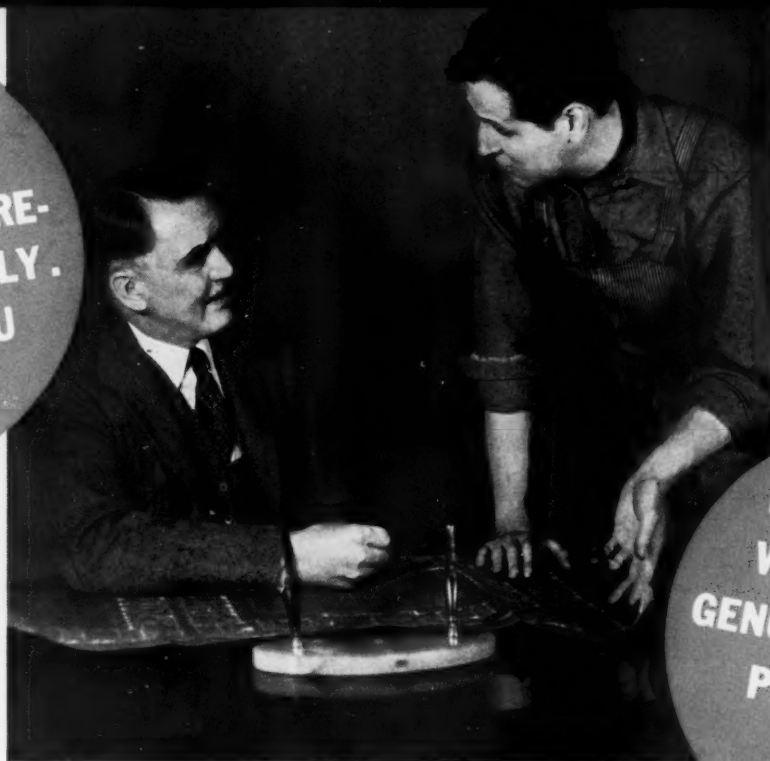
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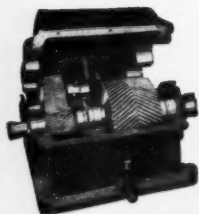
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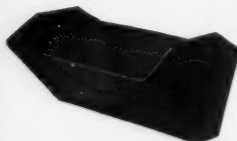
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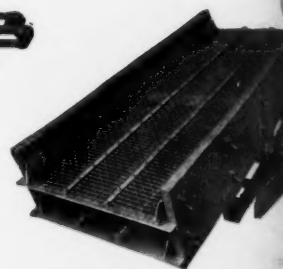
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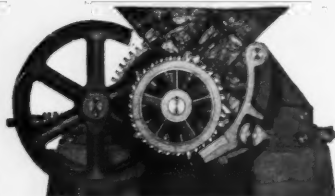
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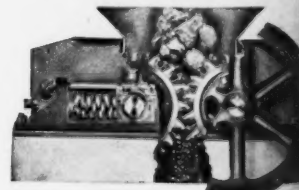
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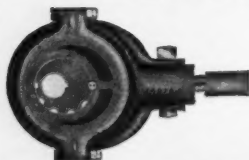
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